Vol. I MARCH, 1921 No. 6

THE AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY

Published Monthly by
THE C. V. MOSBY COMPANY
ST. LOUIS

Foreign Depots:

HIRSHFELD BROS., Ltd., London, England.
STIRLING & COMPANY, Melbourne, Australia.
EMILE BOUGAULT, Paris, France.
EDWARD EVANS & SONS, Ltd., Shanghai, China.
McAINSH & COMPANY, Ltd., Toronto, Canada.
MARUZEN COMPANY, Ltd., Tokyo, Japan.

(Entered as Second-Class Matter October 28, 1920, at the Post Office at St. Louis, Mo., under the Act of March 3, 1879).

Articles to be Published in Early Numbers

of the

AMERICAN JOURNAL OF OBSTETRICS and GYNECOLOGY

A Polycystic Kidney of an Atypical Character.—LeRoy Broun, New York, N. Y.

Ovary Containing Endometrium.—Charles G. Norris, Philadelphia, Pa.

Pathologic Leucorrhea and Its Treatment.—Francis Reder, St. Louis, Mo.

Submucous Adenomyomata.—O. H. Schwarz, St. Louis, Mo.

Some Factors that Determine Tissue Resistance to Cancer.—James E. Davis, Detroit, Mich.

Borderline Carcinoma of Cervix and Its Treatment.—Edward A. Weiss, Pittsburg, Pa.

The Toxic Thyroid; Its Treatment by Ether-Oil-Colonic Anesthesia.—G. K. Dickinson, Jersey City, N. J.

Report of a Few Cases of Postoperative Convalescence, Complicated by Faulty Functioning of the Ductless Glands.—Charles L. Bonifield, Cincinnati, O.

Gangrenous Bullosa in the Newborn Infant.—Magnus A. Tate, Cincinnati, O.

Early and Late Causes of Abdominal Diseases.—Hugo O. Pantzer, Indianapolis, Ind.

Cesarean Section.—Charles A. Stillwagon, Pittsburg, Pa.

Large Mesocolic Hernia in a Female Simulating Cholecystitis.—Ingersoll Olmstead, Hamilton, Ont.

Case of Degenerating Fibroid.—D. C. Moriarta, Saratoga Springs, N. Y.

The Education of Nurses for Obstetric Service.—Sylvester J. Goodman, Columbus, O.

The Treatment of Abortion Complicated by Sepsis.—George A. Peck, New Rochelle, N. Y.

Delivery of Adherent Placenta in Abortion.—Charles E. Ruth, Des Moines, Iowa.

The Influence of Dysthyroidism on the Generative Functions.—Miles F. Porter, Fort Wayne, Ind.

Preparation of the Skin for Operation, with Special Reference to the Use of Picric Acid.—H. W. Hewitt, Detroit, Mich.

Adenomyometritis, Not Adenomyoma of the Uterus.—L. W. Strong, New York, N. Y.

Childlessness.—Charles A. L. Reed, Cincinnati, Ohio.

A New and Modern Treatment of Cancer of the Breast.—James F. Percy, San Diego, Cal.

A Study of the Incidence of Thrombophlebitis and Embolism in Cases of Myoma Uteri.—E. Irene Boardman, New York, N. Y.

Cystopapilloma of the Ovary.—John F. Erdmann, New York, N. Y.

Certain Procedures in Vaginal Surgery.—Samuel W. Bandler, New York, N. Y.

Enuresis.—John W. Keefe, Providence, R. I.

Operation for Prolapse of the Female Urethra.—John D. S. Davis, Birmingham, Ala.

Sigmoidouterine Fistula.—Report of a Case.—W. C. C. Kirchner, St. Louis, Mo.

Case of Congenital Absence of the Vagina with Other Abnormalities.—David Hadden, Oakland, Cal.

Chronic Endocervicitis.—William T. Kennedy, New York, N. Y.

Preventive Gynecology.—Henry S. Lott, Winston, N. C.

A Case of Glandular Partial Hermaphroditism.—Charles W. Moots, Toledo, O.

The Female Pelvic Ureters.—David W. Tovey, New York, N. Y.

The Problem of Effecting Sterilization in Association with Various Obstetrical Procedures.—J. Whitridge Williams, Baltimore, Md.

Maternal Welfare in Relation to the Prevention and Early Diagnosis of Tuberculosis.—Archibald L. McDonald, Duluth, Minn.

The Induction of Labor Complicated by Hemorrhage.—Edward P. Davis, Philadelphia, Pa.

A Study of the Ossification Centers of the Wrist, Knee, and Ankle at Birth, with Particular Reference to the Physical Development and Maturity of the Newborn.—Frederick L. Adair, Minneapolis, Minn.

The American Journal of Obstetrics and Gynecology

VOL. I. ST. LOUIS, MARCH, 1921 NO. 6

Original Communications

PATHOLOGY OF COMMON PUERPERAL LESIONS*

BY JOHN OSBORN POLAK, M.D., F.A.C.S., BROOKLYN, N. Y.

IT IS estimated that twenty thousand women in the United States die annually from childbirth and approximately 43 per cent of this total succumb to puerperal infection, not to speak of the thousands of women who are permanently invalided, as a result of the morbid processes which these infections produce. That this high mortality is preventable cannot be contradicted; yet year after year, the same students whom we send out from our medical schools, whom we have trained in asepsis and conservation, continue to infect and traumatize their patients. It seems odd that the physician who would hesitate to open the abdomen for the removal of a simple appendix, feels perfectly equipped as soon as he has obtained his diploma, to apply forceps or to do any of the several obstetric operations, without a pang of conscience or apparent appreciation of the great danger of infection and the chance of losing both the mother and the child.

I am glad to say that in the past few years in the Metropolitan district, there has been a definite diminution in the amount of septicemia seen by those of us who are practicing consultation obstetrics. Perhaps this is due to the fact that many of the profession are specially preparing themselves for obstetric practice; for most teachers are endeavoring to make the specialty just as important as major surgery.

One cause of the relatively high mortality, is the confusion which exists in the minds of many as to the exact pathologic diagnosis in any given case. The pathology in a case of puerperal infection should

*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20-22, 1920.

be just as definite as the pathology of a surgical lesion; yet almost all cases of childbed fever are included under the general term of puerperal infection and accorded empiric treatment. The purpose of this brief paper is to outline the pathology and clinical course of the several common puerperal lesions, and suggest the indications for, and summarize the treatment to be employed.

A puerperal infection, like any other infection, depends on the inoculation of the puerperal wound by bacteria. In order to thoroughly grasp the physiologic process which actually takes place we must appreciate the fact that the uterus during involution is a puerperal wound. Its interior is undergoing the normal process of repair, and inoculation of this wound will produce either a toxemia or a definite inflammatory reaction, depending largely on the character of the infecting organism.

At first this wound infection is a local process which may be illustrated in the infected perineum, or the infected cervix tear, or the infected endometrium. In each there is an inflammatory reaction in the adjacent tissues, which limits extension of the infective process and confines it to a circumscribed area about the wound or within the uterus. In these localized lesions the pyrexia and other constitutional symptoms are due to two factors, the toxemia resulting from an absorption of the toxins liberated by the bacteria, and to the tissue reaction excited thereby.

The process may be a spreading infection extending beyond the wound area; this is due either to the increased virulence of the infecting bacterium or to the diminished resistance of the tissues. This spreading infection may occur by extension through the lymphatics within the walls of the uterus, or by spreading to the lymphatics in the parametrium produces a parametritis, or a peritonitis, or even a bacteriemia. The infection may also extend through the blood vessels in which case it manifests itself clinically as a thrombophlebitis, an embolic pyemia, or a bacteriemia.

Considerable blood loss at the time of labor always predisposes to infection, for in cases of hemorrhage the uterine retraction is faulty as there is more or less uterine atony. This lowers the individual resistance and consequently reduces the immunity and tissue reaction. Sampson has shown, by injection of the uterine cavity, that proper retraction and contraction of the uterus with an intact endometrium offers a barrier against venous invasion. He found that, with the uterus contracted and the endometrium intact, it was not possible to force a barium solution from the interior of the uterus into the venous radicals. On the other hand, after the endometrium has been removed by the curette, or during menstruation when the endometrium was partially desquamated and the uterus relaxed, he was able to inject material from the interior of the uterus directly into the venous circulation.

This to my mind, is the best proof that a retracted uterus with its normal granulation zone acts as a barrier against the invasion of bacteria from the vulva, vagina, and cervix. Bacterial flora are normal to these regions; but are usually inocuous unless they are introduced beyond the os internum and into a favorable culture medium. After the first forty-eight hours of the puerperium, bacteria may be found within the cavity of the uterus; but if the normal process of wound repair continues, the cavity sterilizes itself by the end of a week. The endometrium becomes infected by the ascent of this vaginal bacterial flora, which is either carried into the uterus by the hands of the obstetrician or by his instruments, or it ascends along bridges of membrane hanging down from the cervix. This permits the bacteria to ascend from the vagina through the cervix, which has had its protective barriers removed by the process of childbirth. Whether these bacteria, when they reach the interior of the uterus, become scavengers or virulent invaders depends largely on the contraction and retraction of the uterus and on the virulence of the bacteria.

If the uterus is well retracted, a leucocytic barrier is thrown out between the infected endometrium and the venous radical, for uterine retraction actually produces a passive congestion in the endometrial tissues. Furthermore, inoculation of the surface of the endometrium immediately excites tissue reaction in the basic membrane and adjacent muscle tissues and the leucocytic wall becomes supplemented by a layer of numberless round tissue cells and this causes the endometrium to be exfoliated in masses and substitutes a granulation zone.

If one can picture the entire interior of the involuting uterus as a large granulating wound, we will be less liable to mistake our indications for surgical treatment. In our experience, infection of the endometrium in the relaxed uterus, and inoculation of a wound in the cervix, are the two most frequent pathologic occurrences that follow delivery. In each we have a definite and typical picture. Ordinarily during the course of normal involution with proper uterine retraction and drainage, the uterus in normal position is capable of sterilizing its cavity. However, when retraction and contraction is poor, the contained bacteria not only multiply with amazing rapidity, owing to the retained blood clots which act as a culture medium, but may gain entrance to the uterine and parauterine tissues through the lymph channels or the venous radicals. The puerperal endometrium after labor or abortion should be considered as a traumatized wound undergoing the normal processes of wound repair. This wound may be infected by pathogenic microorganisms in which case it virtually becomes a large puerperal ulcer. It must not be supposed that the presence of necrotic decidua, or a piece of placenta or membrane, or the entire placenta retained within the cavity of the uterus will produce an endometritis. In order to have an inflammatory reaction in the endometrium, there

must be bacterial invasion. The retained products of conception simply act as a culture medium for bacteria and favor their multiplication. The presence of retained secundines interferes with proper contraction and retraction of the uterus, which in turn diminishes the normal protection to the individual; and while relaxation favors the spread of infection, it does not produce sepsis, unless there is bacterial infection of the uterine contents.

Clinical experience has shown us that a well contracted uterus in normal anteversion is capable of emptying itself of its contents if infection is not introduced from the outside. A relaxed uterus may become bent upon itself, be caught behind the pubis and become extremely anteflexed, or it may be caught below the promontory and become retroflexed; and thus prevent the free outflow of lochia, produce a lochiometra and favor the absorption of toxins, resulting in local pain and constitutional disturbances. This is a mechanical process which is immediately relieved by the establishment of free drainage. On the other hand, a putrid or saprophytic endometritis is an infection of the dead and necrotic superficial structures retained within the uterus which produce irritant material composed of bacterial toxalbumoses and ptomaines. These in turn irritate the endometrium and excite a tissue reaction. These superficial necrotic structures have bacteria in them or on them.

ENDOMETRITIS PUTRESCENT

Contrary to general clinical acceptance Schottmüller has shown that the majority of cases of putrid endometritis are due to an obligate anaerobic streptococcus; but in this form of infection the uterine tissues are protected from deeper invasion by the presence of a well-defined granulation zone. The ptomaine and bacterial toxalbumoses induce an endometritis by chemical irritation which excites a round-cell, proliferation in the deeper layers of the endometrium, and this in turn, brings about a superficial necrosis of the overlying tissues. The degree of this necrosis depends, in part, upon the power of the contraction and retraction of the uterus. If the uterine contents are evacuated within a reasonable length of time, extensive necrosis of the endometrium does not result, but if the tissue reaction continues and the round tissue cells become banked up beneath the endometrium, the necrosis is extensive. If the necrosis is slight we have only an intensification of a normal exfoliation of the mucosa. Thus, with the cause removed, with the emigration of the phagocytic leucocytes and the formation of an antibactericidal lochia, the uterine cavity is cleansed. If, on the other hand, the necrosis is considerable, it may interfere with the normal regeneration of the endometrium; hence the uterine cavity is open to the migration of the pathogenic cocci from below, a mixed infection may develop and the patient may succumb from the severity of the infection.

When a saprophytic endometritis exists within the uterus there is a definite train of characteristic symptoms. The lochia remains bloody and fetid, and is frothy from an admixture of gas bubbles. An examination of the secretions shows the presence of saprophytes and numberless cocci of low virulence. The after-pains continue and from time to time a clot is expelled by painful uterine contractions. These are all evidences of a relaxed uterus. Besides this, there is a toxemia from the absorption of the toxins produced by the superficial necrosis. This absorption from the uterine cavity causes an elevation of temperature and a slight acceleration of the pulse rate. On examination we will find the involution of the uterus retarded; the uterus is large, tender, and more or less relaxed. The abdomen may be slightly distended, but there is no tenderness except directly over the uterus. Should the pelvis be digitally explored, the cervix will be found open, swollen and eroded, and if the gloved finger is passed into the uterine cavity, clots and necrotic debris are encountered and the interior of the uterine cavity is rough and shaggy. This makes up the clinical picture.

We have come to consider relaxation of the puerperal uterus a serious condition, for it allows the spread of the bacterial invasion through open lymph channels and venous radicals. The prognosis of this type of infection depends on the establishment of proper uterine drainage by retraction and contraction of the uterus. When uterine drainage is established and the leucocytic zone is developed, the fever subsides. Hence, it will be argued, if expulsion of the contents is followed by a prompt subsidence of the symptoms, why not empty the uterus of this necrotic debris by surgical methods? Experience has taught us that any sort of trauma to the delicate granulation wall of the puerperal uterus which is confining the infection within the cavity, opens fresh avenues of extension, and that lateral parametritis is a constant sequel of attempts at digital or instrumental evacuation. It does no harm to remove sterile contents but intrauterine manipulation always spreads infection when the content is already infected. It is in this character of case that Dr. Edward Ill, of Newark, has for years been using the alcohol irrigation, with gauze drainage which was suggested years ago by Caroso. We have found that it gives excellent results in these relaxed uteri which are faulty in their drainage because of their position.

COCCAL ENDOMETRITIS

The second type of infection met within the uterus, may properly be called a *coccal or pyogenic endometritis.* In this form the infective bacteria, the streptococcus or other pyococci, have more marked invasive qualities and attack the living tissues. They penetrate into the lymphoid lining of the myometrium, and cause a prompt tissue reaction in the basic membrane and a necrotic layer in the endometrium, which resembles the false membrane of diphtheria.

Whether these cocci advance further than the interior of the uterus, and invade the lymphatics and blood vessels, or remain confined within the uterine cavity, depends upon the completeness and development of the granulation zone, the virulence, and the penetrability of the invading bacteria. If the reaction is sufficient to excite prompt tissue resistance and the leucocytic barrier increases in thickness, the lochia acquires antibactericidal properties which tend to sterilize the interior of the uterus. This observation has been checked up frequently in our clinic. With every puerperal endometritis there is always an associated metritis. This is a defensive reaction on the part of the myometrium against the invading cocci. In this reaction small round tissue cells, leucocytes, fibroblasts, and polyblasts are thrôwn out and are deposited between the muscle fibers and around the gland tubules, halting the further extension of the cocci. From this primary endometritis and metritis, the bacterial invasion may extend through the lymphatics in the uterus into the surrounding connective tissue, or to the peritoneum, or through the veins in the placental site to the blood stream. Since the infection often begins at the placental site, much depends on its condition at the time of exposure. If the uterus is well retracted and the sinuses are closed the defense at this point is effective. On the other hand, if the sinuses are plugged with aseptic thrombi, virulent cocci may infect these thrombi directly or penetrate between the sinuses and enter the vessel from the outside and thus gain entrance to the circulation. *Infections due to the streptococcus pyogenes and the pyococcus alone* do not give rise to fetor, and the interior surface of the uterus is usually smooth and not deeply necrotic. As a rule the bank of granulation tissue suffices to limit the infection to the uterus, unless Nature's beneficient processes are disturbed by the meddling of the accoucheur. The clinical picture is one of acute infection. The symptoms are of greater severity than in the putrid form and are briefly as follows:

For the first two or three days the puerpera is fairly comfortable, but there is usually some indication of brewing trouble such as malaise, a higher pulse rate and temperature than is normal, restlessness, pain in the uterus, and prolonged after-pains. On the third, fourth or fifth day, there is a slight chill or chilly sensation with a rise of temperature, headache, anorexia, and the patient is conscious of a feeling of heat over the body. The pulse may range from 100-140 and the temperature from 101-104° F.; depending on the severity of the infection. The abdomen may become slightly distended, but there is little or no tenderness except directly over the uterus; the involution of the uterus is always retarded. If, however, the infection extends through the myometrium to the peritoneum, there is tenderness over the uterus and in both inguinal regions. The lochia is at first unaltered, but within forty-eight hours it loses its characteristic qualities and becomes serous, flesh colored, or seropurulent.

The lochia is not foul unless large numbers of saprophytes are present. The lochia, however, has caustic infective qualities, and the wounds in the vagina and about the vulva, which are bathed in them, are covered with a pseudodiphtheritic membrane.

On physical examination, the cervix is closed and the uterus fairly well retracted and unless there has been parametrial extension, its mobility is not interfered with. Were it possible to make a digital exploration of the interior of the uterus, it would be found smooth and the endometrium bathed in an odorless purulent or sanguinopurulent discharge. Lymphatic invasion from the cervix is shown in the parametritis postica so commonly found postpartum, which is the chief cause of the backache experienced in the puerperium. Extension of infection from tears in the cervix, and higher up in the uterus, is generally through the lymphatics in the broad ligaments. This extension produces a lateral parametritis or cellulitis.

CELLULITIS

Pelvic cellulitis or parametritis is an inflammatory reaction of the pelvic cellular tissue to a bacterial invasion. The bacteria reach the parametrium through the lymph stream and excite a tissue reaction in which serum, leucocytes and round tissue cells are poured out producing a local inflammatory swelling. In order that we may better appreciate where to look for these inflammatory swellings, it may be well to briefly review the anatomic arrangements of the pelvic connective tissue.

The pelvic connective tissue lies under the peritoneum and between the pelvic peritoneum and the pelvic diaphragm. It forms the loose connecting and supporting areolar structure between the organs and the pelvic wall, between contiguous viscera and the soft structures. It spreads from the uterus as a center and radiates outward in all directions, each part reaching the pelvic wall. It surrounds and supports the blood vessels, nerves, lymphatics and forms thin sheaths. It is condensed into strong bands and ligaments forming the aponeuroses of muscles and the ligamentary attachments of the pelvic viscera. Infections from traumatisms of vagina and cervix chiefly involve this loose, fatty tissue and the infection is directed by and confined between the fascial sheets and ligamentary planes.

The lymphatic channels which drain the greater part of the vagina, the cervix and lower uterine segment pass out along the base of the broad ligament, and are supported by this arbor of cellular tissue. These follow the course of the uterine vessels to the hypogastric and iliac glands. The lymphatics of the fundus and upper part of the body of the uterus follow the ovarian vessels in the infundibulopelvic ligament to the glands at the bifurcation of the aorta and the lumbar group. Lymph channels also run into the uterosacral ligaments to the sacral glands and through the round ligaments to the inguinal glands.

ETIOLOGY

The majority of cases of cellulitis are due to infection by the streptococcus pyogenes. The staphylococcus and bacillus coli, and occasionally the gonococcus, are found in combination, but the streptococcus is the chief infecting agent of cellular tissue. The severity of the infection depends on the virulence of the infecting organisms. It has not been proved that the gonococcus can by itself produce primary pelvic cellulitis, neither does an uncomplicated gonorrhea give rise to the same inflammation and abscess formation seen in a streptococcus infection.

The most common avenue of entrance is through injuries to the cervix and vaginal vault during labor; for besides the general softening of the tissues, the enlargement of the connective tissue spaces, and the increased vascularity due to pregnancy, there is a direct bruising of the parts during labor, all of which favor infection.

The cervix and surrounding tissues are subject to the greatest trauma, consequently the tissue resistance here is lowest. Furthermore, lacerations at these points open into extensive cellular spaces. Even trivial injuries may act as points of ingress; but, as a rule, there is the history of an instrumental delivery, manual or bag dilatation, or a dry labor with frequent vaginal examinations. The chances of infection are greater under these circumstances. This form of inflammation is comparatively rare after abortion as the cervical tissues are not subjected to such a degree of trauma; hence, tubal rather than parametrical complications with peritoneal extension are the usual course.

PATHOLOGY

The organisms invade the lymphatic channels and by their presence, and the toxins they produce, excite a hyperemia which is followed by an effusion of protective serum and a hurried migration of leucocytes into the soft areolar tissue, which with the deposition of small round cells make up the exudate. This increases the tissue bulk and gives rise to a soft swelling which later becomes hard from the formation of a more fibrinous exudate. This exudate is generally limited, at first, to the base of the broad ligament on the involved side. As the exudate is poured out, it follows the line of least resistance in the cellular tissue between the fascial sheets forward and outward to the anterolateral pelvic wall and iliac fossa; or it may proceed backward along the uterosacral folds, lifting the posterior layer of the peritoneum. The fibrinous deposit which is thrown into the pararectal and prevertebral connective tissues fixes and displaces the uterus and rectum, and more or less obliterates the portio vaginalis, holding the pelvic organs in a hard sensitive mass; or the exudate may spread forward to the base of the bladder and so reach the anterior pelvic and abdominal walls.

Clinically we have found that the exudate may spread in almost any direction along the cellular tissue planes. It may be unilateral or

bilateral, most frequently the former; or it may spread around the cervix from side to side, obliterating the portio vaginalis, leaving the os as a mere dimple in the vaginal vault; or the bacteria may follow an unanatomic course, even passing through muscle or fascia, in which case the exudate may be found in locations where it is least expected. The exudate varies in its extent and consistence depending on the virulence of the germ and the resistance of the patient. In mild cases there may be nothing but a simple inflammatory edema; and again, in the more virulent types of cellular infection, the exudative process is limited to a serous and poorly defined cellular infiltration, for the bacteria quickly pass through the lymphatics to the peritoneum or into the blood stream. Fortunately for the protection of the individual in most cases there is an adequate protective tissue reaction with the formation of large exudates. Section through these masses shows the lymph vessels thickened, tortuous and beaded, and a yellowish or whitish pus exudes from numberless minute openings. The lymphatic chains are surrounded with exudate giving it a glistening, glassy, moist appearance. The veins are often thrombotic, either from primary or secondary infection; or the thrombi may undergo puriform degeneration, the debris breaking up and getting into the circulation forming infected emboli.

As the exudate increases in size, the blood supply is increased; this is especially apparent on the venous side and later, as cicatricial tissue forms and the scars shrink, the arteries are kinked and varicosities occur in the veins, while the ganglia and nerves may become pinched in the contracting cicatrics. This explains the pain and the frequency of pelvic varicosities in patients who give a history of an infected puerperia.

Coincident with the pouring out of exudate into the cellular tissues in the broad ligaments there is always a subperitoneal edema and necessarily the pelvic peritoneum takes part in the inflammation and throws out an exudate upon its surface which causes the tubes and ovaries to become matted together and adherent to the broad ligaments, uterus or the intestines, which, clinically, give the impression of large exudate masses.

It may be stated that parametritis always excites some degree of perimetritis. This inflammatory exudate may undergo complete absorption or may go on to suppuration. If absorption occurs there is always some pathology which permanently remains. When an exudate suppurates the pus is discharged externally or becomes encapsulated, limiting the mobility of the pelvic viscera and occasioning premenstrual pain. In the milder infections, with a serofibrinous exudation, complete resolution usually takes place. Large masses of fibrinous exudate may completely disappear without leaving much edema or tissue damage. There are, however, always varicosities of the pelvic veins to tell the story of the intense venous engorgement, necessary to supply the protective exudate needed in Nature's attempt to bury the infecting invaders.

In the more severe infections, suppuration may occur with the formation of an abscess cavity or necrotic areas may appear in various parts of the exudate, and these become converted into pus. Commonly there is only one cavity which results from the conjunction of several pus foci. Occasionally the entire pelvis may be riddled with abscesses. Multiple foci of suppuration are commonly of thrombotic origin and really belong to a different class than the simple cellulitic abscess.

These large abscesses, dependent upon their proximity to one of the hollow organs, are apt, in the course of from twenty to seventy days, to point; and unless they are evacuated by operative measures, may break into the rectum, bladder, vagina or through the skin above Poupart's ligament or into the peritoneal cavity. If the pus is completely evacuated, the cavity closes rapidly. Unfortunately when these abscesses open spontaneously, it is seldom at the most dependent point; there may be other or more remote foci, hence the pus is not completely evacuated and the septic process may be kept up for weeks or months. Sometimes the abscess does not open and Nature cures the condition by encapsulating the pus. The wall of the abscess is thickened and becomes firm with fibrous tissue, while the more fluid part of the pus is absorbed. Such a tumor may persist in the pelvis for years, gradually shrinking in size.

It is important to note that the encapsulated germs do not always lose their virulence, but may on the occasion of subsequent traumatism or operation break out with increased virulence and cause a bacteriemia. Unless there has been considerable trauma of the soft tissues, it is remarkable to see how little scar tissue is left after these connective tissue abscesses heal. On the other hand, when there have been extensive lacerations and trauma of the soft parts, as tears through the cervix, into the lower uterine segment, and into the base of the broad ligament, the woman is left with a permanent displacement of the uterus owing to contraction of the cicatricial tissue.

Pelvic cellulitis may be complicated by femoral thrombosis and phlegmasia alba dolens. Though I believe that the more severe cases should be regarded as a septic thrombosis with an accompanying cellulitis, it is conceivable also to believe that an immense exudate may of itself be sufficient to cause compression of the pelvic veins and produce edema of the thigh or leg. This is so, especially when the exudate is in the anterior portion of the pelvis between the peritoneum and the pelvic bones.

BACTERIEMIA

Bacteriemia means the presence of bacteria in the blood. It is an acute infectious disease, produced most frequently by the streptococcus septicus and occasionally by the staphylococcus. *These cocci with their toxins* produce changes in the blood destroying the red cells, as well as the leucocytes, and cause degenerative changes in the organs through which they pass, notably, the heart, the liver, and the kidneys.

Besides the streptococcus and staphylococcus, which are the most common invaders of the blood stream, the pneumococcus, the bacillus pyocyaneus, the gonococcus, the bacillus aerogenes capsulatus, and several anaerobic bacilli, have been found in blood cultures.

In postabortal and puerperal infections entrance is gained into the blood stream by two routes; first, by lymphatic extension; second, by direct invasion of the venous radicals and sinuses. Each mode of invasion proceeds in a definite manner and the clinical pictures produced differ so much that it is generally possible to make a differential diagnosis. Occasionally, however, the pictures are indistinct and differentiation is impossible. The lymphatic form develops from an endometritis; the infection in turn extends to the myometrium, and the parauterine lymphatics, but it is so virulent that instead of exciting an active reaction in the parametrium and parauterine spaces, the reaction simply excites a serous exudate with local edema and the infection proceeds directly into the blood stream, or through the lymphatics to the peritoneum, exciting an acute purulent peritonitis. The vascular form almost invariably begins as a uterine phlebitis, primarily as an infection of the thrombi in the placental site with an extension of the infected thrombi into the veins. From these infected thrombi the bacteria enter and multiply in the blood, and consequently locate in distant organs; such as the pleura, the lung, the endocardium, and the brain. Occasionally the thrombi may suppurate, but this is not common in streptococcemia. However, as a result of such a suppuration, bits of infected fibrin or actual pus may get loose and be carried away by the blood stream to remote parts of the body, and there locate and cause local abscesses. The lung, kidneys, and the brain are the points most frequently reached by these infected emboli.

In blood stream infections the local pathologic reaction is considerable, consequently the local symptomatology is insignificant; for whether the bacteria enter the blood stream via the lymphatics, or via the veins, their transit is so rapid and the reaction caused so insignificant, that appreciable local lesions must necessarily be absent. For the entrance of bacteria into the blood stream, there must be a puerperal wound which is inoculated by bacteria. This may be at any point in the genital tract, the vulva, the vagina, the cervix or in the placental site.

Women who have had severe postpartum hemorrhage, or have been toxic prior to their delivery, offer less resistance to coccal invasion than women whose antepartum or interpartum period has been less depleting.

In the vascular forms of bacteriemia the lymphatics are not involved at all, or if so, to a very decidedly less extent. The veins of the placental site are filled with large thrombi which are swarming with bacteria. The bacteria erodes the endothelial lining of the vessel; fibrin is therefore deposited on the eroded surface, and a clot occludes the lumen and this process advances through the venous plexuses of the broad liga-

ment into the ovarian and iliac veins, and even to the vena cava. From the surface of these thrombi, bacteria are liberated into the blood stream, and, if they are strong enough, multiply in it, and a fatal bacteriemia may result. If the bacteria are less virulent the process becomes more chronic, the thrombi undergo puriform softening, and solid bits of thrombus or droplets of pus break loose, float in the blood stream, lodge in distant parts of the body, setting up new focci of suppuration, causing a condition of true pyemia.

SYMPTOMS

A period of incubation of from one to three days usually precedes the outbreak of the severe symptoms. Occasionally threatening prodromes appear within a short time after the inoculation, and the woman becomes seriously ill and may die within thirty-six hours. Ordinarily the prodromal stage is manifested by the signs and symptoms of the local process in the uterus from the site of which the bacterial invasion of the blood has extended.

In consideration of the pathology, we have shown how bacteria may enter the blood stream with infected thrombi from a local ulcer through the lymphatics, from an endometritis or parametritis, or from the placental site. It is, however, frequently impossible to determine when or how the germs get into the blood; yet since our bacteriologists have been using anaerobic methods, we have often been able to cultivate the streptococcus from the blood where the diagnosis of a purely local lesion has previously been made.

The following syndrome is indicative of a serious bacteriemic infection, though it is claimed that absorption of toxins in large amounts will produce similar symptoms. This I cannot verify from personal experience. Blood invasion is ushered in by a severe chill lasting from five to thirty minutes. During the chill the skin is pale, the face is pinched, and the lips and fingers cyanotic; the temperature rises rapidly to 103-104° F. and the pulse rises at once above 120, varying from 130 to 160. At first the pulse is full and bounding; but it soon becomes soft and compressible, for the bacteria and toxins in the blood weaken the heart muscle. Owing to the rapid destruction of the red blood corpuscles, the oxygen-carrying power of the blood is diminished and the patient exhibits marked pallor; the finger tips are cyanotic, the respirations are hurried, and the woman looks profoundly sick. The white blood cells show no tendency to increase owing to the intense and overwhelming intoxication. As a result of the rapid production of toxins the nonstriated muscle in the heart and intestinal tract undergo cloudy swelling and lose their tone. As the heart weakens, the blood pressure falls, and there is more and more tympany from intestinal paresis. This further embarrasses the heart and respiration. Malaise becomes a prominent factor early in the attack, the woman appears prostrated and is appre-

hensive of impending danger. Headache and sleeplessness are constantly complained of, and even though the patient has no pain, she does not sleep. This symptom is particularly ominous. The mind may remain clear until near the end. This, however, is unusual, as a mild delirium becomes more marked.

The bacteriemic symptoms may occur alone or be succeeded by the symptoms and signs of a purulent peritonitis, i.e., nausea, vomiting and pain. These with the facies hippocratica show the end is not far distant. If the bacteriemia has occurred as the result of rapid lymphatic invasion from a coccal endometritis, local pelvic symptoms may coexist. The lochia are usually profuse and putrid, the result of a gangrenous endometritis; though in the severer types the lochia may be scant and free from odor. The odor is pungent and the puerperal wounds become necrotic. Signs of peritonitis such as tenderness, tympany, spreading rigidity, ileus, etc., begin, and if the patient lives long enough, the picture becomes one of virulent peritonitis. When this occurs the temperature may go down, but the pulse always rises and the tongue becomes dry. A peculiar sickening fruity odor is noticed about the patient, and while she feels easier, the objective symptoms grow worse. The body is cold, the face flushed, and beads of cold perspiration appear on the forehead; while the nose, lips and ears are of a leaden gray. Death usually occurs in coma preceded by pulmonary edema.

The duration of the disease is from two to ten days. It is especially virulent if it begins during labor, and then its course is usually short and violent. Eruptions on the skin resembling the exanthemata occasionally occur. This has nothing in common with true scarlatina; though the pregnant woman is not immune to the disease. It is really a toxic streptococcic erythema. There is no angina and this helps in making the differentiation.

Broadly speaking, the treatment depends on the pathologic diagnosis and may be considered under the following heads: 1. Local measures which secure drainage and uterine contraction. 2. General supportive measures that increase the patient's resistance, which should include transfusion. 3. Specific remedies are of especial value in blood stream infections. 4. Finally, surgical measures. The latter are only applicable to abscess formations, thrombotic lesions of the pelvic veins, and spreading peritonitis.

287 Clinton Avenue.

(*For discussion, see p.* 627.)

VERSION*

By Irving W. Potter, M.D., F.A.C.S., Buffalo, N. Y.

IN ADDRESSING you upon the subject of version this evening, I assume that I am speaking to men who have been specially trained and are experienced obstetricians, and, therefore, if I am bold enough to criticise present day teaching, it is because I have found nothing that would assuage and alleviate the pains and the agonies of the second stage of labor which, to my mind, is the desired aim of modern midwifery. The abdominal surgeon taught us that it was safe and practically without mortality to invade the peritoneal cavity and uterus from above, and thus he led the way for our modern Cesarean section which has resulted in the saving of many lives. I propose to demonstrate to you that it is equally possible and infinitely less hazardous to invade the uterine cavity from below and bring about the safe delivery of the baby without pain and suffering, or undue injury to mother and child.

I shall not attempt to give you the indications for a version, but rather confine my remarks to my method of performing version and the results to mother and child by reason of the operation. Of course, it is self-evident to you all that my range of usefulness and my field for its indications have become so broad, by reason of experience and much practice, that I use it, in normal conditions, simply to relieve women of the pain and suffering of ordinary childbirth by shortening the time of labor and that fact is demonstrated when I say that I personally delivered last year 1113 women, of which 920 were delivered by version 400 being primiparæ and 520 multiparæ.

I have thought it best to describe as briefly and as fully as I can, my method of podalic version. The patient is prepared as for any major operation, shaved, scrubbed and made as clean as possible. The operator is similarly treated and then gowned, with short sleeves and long gloves reaching to the elbow.

The woman is placed upon the table and anesthetized to the stage of surgical anesthesia, then there is no resistance to the various procedures to be carried out. She is then placed in a modified Walcher position, one leg held by an assistant standing on each side, or if no assistants are available, the legs are supported on two chairs while the operator stands between them.

The bladder is emptied of all its urine, and this is very impor-

*Read at a meeting of the Philadelphia Obstetrical Society, November 4, 1920, as here presented. Also in modified form at the meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, September 20-22, 1920.

Fig. 1.—Beginning to "iron out" the birth canal with one finger.

Fig. 2.—"Ironing out" process continued with two and three fingers.

Fig. 3.—Showing finally, the whole hand introduced into the vagina.

Fig. 4.—Hand and arm introduced into vagina with towel around operator's arm to protect him from escaping fluid.

tant, as many patients void and still retain a half pint and more of urine in the bladder.

The vagina and soft parts are now dilated by first putting in one finger of the gloved hand, well lubricated with green soap, and passing it up as high as the cervix and then withdrawing it with a steady, continuous and firm pressure. Then two fingers are inserted and then three fingers, and finally the closed fist until all the rugæ and folds of the vagina are thoroughly ironed out. It matters not whether the case be a primipara or a multipara, the procedure can be just as satisfactorily and completely done.

Now the cervix, which must always be obliterated or soft and easily dilatable before version is ever attempted, is gently stretched with the fingers. Then the outstretched hand and the arm is pushed high up between the uterine wall and the membranes, and the latter are gently separated all over by sweeping the fingers of the hand up and down and around, being careful not to work too near the placenta.

Next a towel is rolled around the wrist to catch any of the amniotic fluid which might gush out when the membranes are ruptured high up. The hand is now free in the uterine cavity, the position of the child is made out and its probable size estimated, the position of the cord ascertained and the diameters of the pelvis approximated.

Both feet are now grasped between the first and middle fingers of the left hand—the left hand is always used for the version no matter what position the child is in. According to the position of the child, the toes of the feet will either look to the palm of the hand of the operator or away from it.

Now the extraction begins and both feet are brought down to the vulva and delivered together, the child's body having rotated with this onward movement.

Slight pressure is sometimes necessary at this stage to lift the head out of either iliac fossa with the right hand. Continued gentle traction is made until the knees are exposed, at which time the version is complete. Now rest for a few moments and then gently pull upon the anterior foot and lower leg until the pelvis of the child comes into view, when it will be seen that the pelvis rotates in the opposite direction and is eventually delivered in that direction. This rotation is brought about by the traction on the lower leg and the baby comes into the world with its back transverse to the pelvic outlet. No attention is paid to the cord at this time if it is free and loose, which it usually is, but if it is tight and short a clamp is placed at the umbilicus and the cord is cut, if it can't be otherwise loosened.

We now proceed with the delivery of the scapulæ which must be always thoroughly exposed and well out in view before any attempt is made to deliver the shoulder. Then the fingers and the hand of the operator are pushed well above the shoulder between the lips of the

Fig. 5.—Both feet brought outside of vagina. Note method of grasping feet by operator.

Fig. 6.—Version completed. Knees exposed.

Fig. 7.—Buttocks of child being delivered by expulsive efforts of mother.

Fig. 8.—Back of child rotated squarely across outlet.

vulva and the anterior shoulder is delivered with the upper arm. The operator now grasps the baby with his hand over the exposed shoulder and chest and rotates the child's body so that the posterior arm comes anterior and is delivered as such. Both shoulders being now delivered, the lower arms usually fall out of themselves. If, however, they remain undelivered they can be gently lifted up across the chest of the child and drawn away from the perineum under the pubic arch. (You will observe that the baby in this rotation movement is not twisted from the legs as I have seen it done.) The older method of version brought the arm down as a posterior arm across the distended perineum, which was often the cause of the extensive tears consequent upon that method of podalic extraction.

The operator now determines whether there is any loop of the cord around the neck and finding none he proceeds with the delivery, but if the cord be twisted once or twice or even three times around the neck this condition of the cord must, if possible, be relieved, by loosening it, and if absolutely necessary, it must be cut and clamped. However, usually the cord is free and no haste is called for.

The fingers of the left hand are now inserted into the baby's mouth and with the right hand gentle pressure is made upon the occiput over the pubes to aid in the flexion of the baby's head and also to direct its passage through the pelvic canal. The jaw is not pulled upon, as a fracture might result.

Up to this point no pressure from the outside has been made in the delivery, because such pressure over the head before delivery of the arms, has a tendency to push the head down, which allows the arms to go up as well as extend the chin, complications, which at all times must be avoided, and I am sure it is this pressure that makes the difficulties and dangers of other methods of version.

By this time the baby's mouth is exposed and the mucus is milked out of the throat by the fingers gently stripping the front of the neck, when the baby will begin to breathe and often cry aloud.

The head can be left in this position long enough to thoroughly dilate the perineum and vaginal structures, as no haste is indicated and finally the nose is delivered, followed by the brow in an extremely flexed condition which is further assisted by lifting the body well forward and up from the perineum.

The baby is now placed upon its right side on its mother's abdomen and allowed to remain there until the cord ceases to pulsate. The ligature is now placed around the cord and the cord is cut and a hypodermic of pituitrin 1 c.c. is given deep into the muscles of the mother. The third stage of labor can now be completed immediately if any indication exists, or the placenta can be left from 15 to 20 minutes and often it is expelled spontaneously. If not, the gloved hand can be introduced

and it can be extracted manually. The patient is now put to bed and usually with a binder.

During the past three years a number of physicians have visited me in order to witness my technic in performing a version, and it is their questions and remarks that have suggested this paper. The impressions gained from talking with them leads me still further to the belief that very few men understand the technic or the advantages of a properly performed version. This ignorance is due largely (1) to an almost complete lack of teaching of this subject in our medical schools today and (2) to an amazing amount of inactivity or want of initiative on the part of the practitioner and especially the teachers and professors of obstetrics.

The following are some of the questions put to me by visitors and others:

What are the indications for version and why do you do it? What is the condition of the cervix when you attempt version? What position does the head occupy? How far down is the head before version is attempted? Why do you bring down both feet instead of one foot? Why is the anterior arm delivered first? Why don't you hasten delivery after the umbilicus can be seen? How do you overcome extension of the head and of the arms over the head? How do you save the mother's soft parts, especially the perineum, from lacerations? Why your apparent indifference as to the child's breathing immediately after birth?

Let me answer these questions and at the same time epitomize and dwell on their importance. I also wish to point out that I do a version to eliminate the second stage of labor and thus relieve a woman of the pains and agonies of childbirth.

1. The cervix must be obliterated and the os dilated or dilatable, before version is attempted. This condition is easily determined by careful examination. The cervix need not always be entirely obliterated if it is soft and easily yields to the advancing hand.

2. The position of the presenting head is of no particular importance. A version can always be successfully performed if the presenting head can be lifted above the brim of the pelvis. Sometimes the head is so wedged in the pelvis, when the waters have drained away, that version is impossible. When this condition obtains, delivery by forceps or other means is necessary.

3. Both feet are brought down because the delivery is easiest when this is done; and, if necessary, in the interest of both mother and child, the labor can be terminated more quickly. By pulling on both feet the obstetrician distributes traction more evenly and thus secures a better dilating wedge.

Both feet, instead of one foot, should be brought down at the same time.

No attempt to deliver the arms should be made until the scapulæ are outside the vulva. The anterior arm should always be delivered first.

4. The anterior arm is delivered first because by so doing we relieve the stretching and tension of the soft parts of the mother, and permit

Fig. 9.—Anterior shoulder delivered under pubic arch.

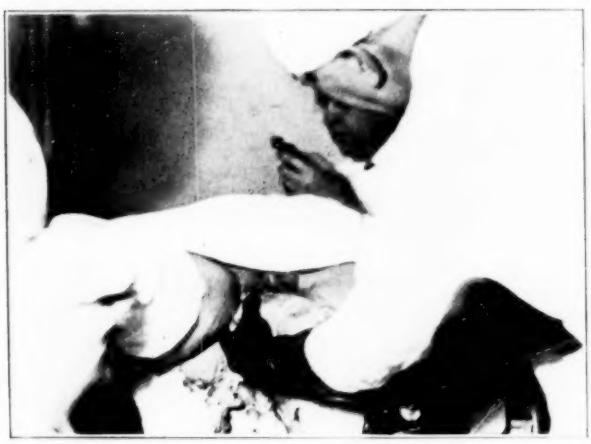

Fig. 10.—Rotating posterior shoulder to position of anterior shoulder.

rotation of the child's body so that the posterior arm now becomes anterior.

5. I never hasten delivery after the umbilicus comes into view because experience has taught me that haste is unnecessary; that severe complications such as extension of the arms and of the head are very

Fig. 11.—Rotation of posterior shoulder completed.

Fig. 12.—Delivery of the well-flexed head.

Fig. 13.—Child placed upon abdomen of mother.

Fig. 14.—Prolapsed cord.

apt to take place when we interfere with the natural forcing powers at this particular stage of delivery.

6. Extension of the head is overcome by aiding flexion of the head with the fingers of one hand in the child's mouth, and with the other hand making gentle pressure upon the head over the pubes.

7. The perineum and soft parts of the mother are saved, first of all, by deep anesthesia; secondly, by having the patient in the partial Walcher position, which gives one good control and admits of slow and safe delivery of the head after the vagina and perineum have been previously ironed out and properly dilated.

8. I am apparently indifferent to the child's breathing immediately after birth. Experience has taught me that nearly all of the babies begin to breathe spontaneously when let alone, provided the heart is beating. Occasionally when respiration is unusually delayed a catheter is passed into the trachea. Rough handling of the baby after it is born is never tolerated.

9. During the delivery, as soon as the mouth is exposed over the perineum the baby's body is raised up to let the mucus run out of the mouth. Blue babies give me no anxiety but white babies do.

10. The operator must remember that in the delivery of the head extreme flexion is necessary and that this flexion can be best produced by placing the fingers of one hand in the child's mouth and by making gentle pressure upon the head over the pubes with the other. If extension of the head takes place notwithstanding every care, complications at once arise but in the hands of an experienced operator extension of the head does not occur or at all events is very infrequent.

11. When the chin and mouth have been delivered the mucus will run from the child's mouth and nostrils or it may be milked out by gently stroking the neck and thus many children will breathe before delivery of the head is complete. Therefore haste is unnecessary.

12. Too great pressure upon the mother's abdomen during delivery of the head should be avoided for fear of injuring the bladder or lower anterior uterine wall.

13. The after-coming head may be delivered by forceps if necessary.

14. The operator should at all times have a perfect knowledge of the position of the child *in utero* before version is attempted and an exact knowledge of this can be obtained only by introducing the hand to the fundus and exploring the uterus and the fetal parts carefully.

Men have criticized me for saying that I find posterior occipital positions in from 60 per cent to 70 per cent of my cases. It is because I examine these women many hours earlier and before rotation has taken place.

15. If the membranes have not been ruptured, it is well to separate them all around and as high up as possible from the uterine wall before rupturing them. The rupture should be made high up for the purpose of retaining as much of the amniotic fluid as possible.

16. When the knees of the child appear at the vulva, the version is complete.

17. The operator should be master of the situation at all times and with the child's chest resting in his hand he can watch the fetal heart as he can feel its pulsation in his hand. I have never broken an extremity in a living baby during version. On three occasions the humerus was broken in delivering dead babies and when haste was necessary in the interest of the mother.

18. The extreme lithotomy is not the best position for the patient when a version is performed. The modified Walcher position admits of better results by relaxing the soft parts of the mother. This position can be obtained only by having the assistance of two attendants who hold the legs one on each side or by allowing the feet of the patient to rest upon two chairs if assistants are not at hand.

19. When the child is born, it is placed on its right side across the abdomen of the mother. This position aids perhaps in the closure of the foramen ovale. The child remains upon the abdomen until the cord is tied and cut. At this point I should like to enter a protest against the too common practice of spanking or beating the baby to make it breathe, as this is unnecessary and may do harm. I rarely have to do anything except hold the baby up with its head down to allow the mucus to run out of the mouth or blow a few times upon the child's chest to establish respiration quickly. Sometimes we breathe into the child's trachea through a small catheter but not very often. In my early practice I did this more frequently but now I know that haste and anxiety in inducing the child to breathe are seldom necessary.

20. The third stage of labor may be completed by delivering the placenta manually. It is my practice, however, to administer by deep hypodermic injection into the muscles of the mother, 1 c.c. of pituitrin immediately after the birth of the child and in a very short time the placenta is expelled with very little hemorrhage.

I never bag these cases, because a natural dilatation of the cervix is desired and this is not obtained when bags are used. The dilatation and retraction of the cervix which leads to the desired obliteration begins above and is not the same as that brought about by the use of bags. Bags also displace the presenting part and predispose to prolapsed arms, a thing that happened twice last week in New York City, which I have not seen before in three months.

Now what advantages do I claim for my method of version?

1. The woman suffers no pain after the dilatation of the os has taken place. Therefore I eliminate the second stage with all its suffering and it seems to me women will not dread their confinements and will have more children.

2. The soft parts are thoroughly dilated and are not for a long time

subjected to pressure so that a relaxed, flabby vagina, and torn perineum and prolapsed bladder does not occur in our practice.

3. We see no temperature in our cases because we believe that tender tubes and ovaries, and perhaps many of them the subject of latent gonorrheal infections, are not lighted up into activity by the long pressure and bruising of the on-coming head.

4. The woman suffers no shock and therefore should be more resistant to possible infection.

5. There is no bleeding of any moment in our cases and the uterus remains contracted and in better condition after the delivery is effected. The lochia is less in amount.

6. We believe the baby's head is subjected to less compression injury than is the result after a long and tedious labor and especially after a forceps delivery. Therefore epilepsy and other cranial complications should be less common than after ordinary labors.

7. Of lesser importance but yet a justifiable consideration, the attending accoucheur is worked less, has more leisure and finds his specialty an agreeable one to practice, instead of what it is now, the bugbear of medicine.

The maternal mortality in properly selected cases should be *nil*. The maternal morbidity is no greater and I am satisfied is much less, than that in normal cases and my records and temperature charts will prove this statement. Compression injuries to the baby's head are very rare. In my experience the mutilation of the soft parts of the mother is less than in forceps deliveries or as is seen in long protracted second stage labors and in the end these patients go home in good condition, happy, and well satisfied. I have never torn the perineum through the sphincter and only rarely up to the levator, while injuries to the bladder do not occur because the bladder is always emptied before the version is started and is always lifted so high up that it is not even seen during the delivery and therefore it is not torn off from its pivotal point of attachment at the internal os or from the descending rami of the pubes and ischium.

The fetal mortality was certainly no greater than that which is attendant upon other methods of delivery. Cord complications must always be seriously considered when we speak of stillborn children. I believe the cord is responsible for the greatest number of fetal deaths. In many cases this is not recognized on account of the concealed type of prolapsus funis, when the cord is caught between the head and the brim of the pelvis and the death of the child follows from pressure upon it.

For various conditions I have delivered by version and reported, 2900 cases. I have never broken an arm or leg of a living baby—three times an arm of a dead baby was broken when haste was necessary in the mother's interest. I have never had any alarming hemorrhages

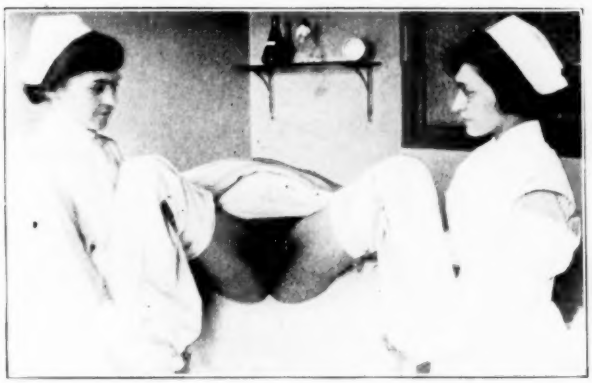

Fig. 15.—Proper position with assistants.

Fig. 16.—Proper position where no assistance is at hand.

Fig. 17.—Improper position for version.

and the period of involution of the uterus in all of these cases was shorter and with less lochial flow during the lying-in period. I never had a case of postpartum hemorrhage. Convalescence too was more rapid. I attribute this favorable condition to the absence of all shock which is so often experienced by patients who go through a long second stage of labor. The uterus was not tired out neither was the delivery precipitate. Then too there was present greater strength and a better sense of well-being at the end of the puerperium.

Fig. 18.—Properly gloved hand for version.

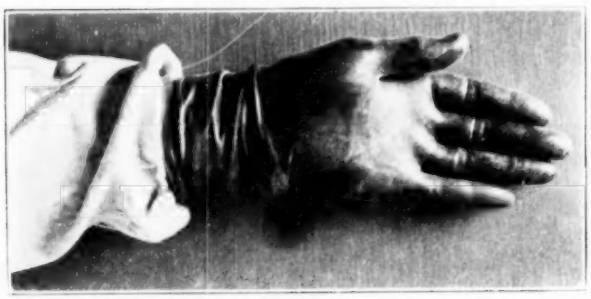

Fig. 19.—Improperly gloved hand for version.

As I have previously stated, for the year ending August 31, 1920, I personally delivered 1113 women, 920 of which were delivered by version. Of the 920 versions, 400 were primiparæ and 520 were multiparæ. There were in this total number of cases:

80 abdominal Cesarean sections.
13 footlings.
22 breech cases.
2 vaginal Cesarean sections.
39 instrumental deliveries.
2 cases were delivered by instruments on the after-coming head following version.
There were 9 cases of twins.
12 cases delivered themselves before they could be reached.
There were 10 cases that were delivered as vertex cases.
There were 3 face cases, 2 with the chin anterior and 1 with chin posterior. It was necessary to do a craniotomy in one case.

There were 41 stillborn children, classified as follows: breech, 2; short cord, 2; hydrocephalus, craniotomy, 1; prolonged labor, faulty presentation, 1; prolapsed cord, no pulsations felt, 5; hydrocephalus, 2; hydrocephalus, spina bifida, 1; face presentation and prolapsed cord, 1; twins, premature, 4 months, 1; disproportion between child and pelvis (weighed 10 pounds each), 3; eclampsia, 1; macerated fetus, 6; monster, anacephalic type, 5; cord around legs and arm, 1; macerated fetus, specific, 1; albuminuria of mother, 1; L.O.P., 1; placenta previa, 7 months, 1; fibroid tumor, complicating labor, 1; brow, 1; marginal placenta previa at term, 1; diabetes in mother, 1; faulty position of head at term, seen in consultation, instruments had been applied, child dead, 1.

Of the complications those having to do with the cord were most numerous and seem to bear out my statement made previously that cord complications are the cause of the majority of our stillborn children.

There were 16 prolapsed cords; 10 short cords; complete knots were found in 3 cases; twisted cord was found in 2 cases; the cord was around the neck once in 37 cases, twice in 13 cases, three times in 3 cases, four times in 1 case, six times in 1 case, with a living child; once around the neck, and between the legs 4 times; twice around the neck and between the legs 2 times; cord between the legs, necessitating cutting before delivery, 5 times; cord around both legs, once.

There was one case of loose placenta and one of adherent placenta; marginal placenta previa, 7 cases; central placenta previa, 2 cases.

The largest baby was 12½ pounds, another weighed 12 pounds, 1 ounce.

There were 34 children who died in the hospital before being discharged or inside of 14 days from birth classified as follows: One congenital syphilis, aged 8 days. Fourteen convulsions, from 36 to 72 hours. These were not after difficult deliveries so I am satisfied they were not the result of cerebral or petechial hemorrhages.

One hemorrhage into and rupture of suprarenal gland—found by autopsy 4 days after birth.

Ten were bleeders living from 2 to 6 days who bled from the mucous membranes, bowels, eyes, nose, etc.

Five cases of inanition living from 6 to 10 days and the cause of these deaths I cannot explain.

Three monsters living from 2 to 3 days.

Two mothers died who had been delivered by version, one a poorly nourished patient sick with a colitis and running a temperature for a week before delivery, living 41 days and then dying from the effects of her colitis which she had had for years. Blood cultures 3 weeks following delivery were sterile. The second case was up and around the hospital ready to go home, when she developed a lobar pneumonia, from which she died four weeks after delivery.

420 Franklin Street.

(*For discussion, see pp. 629 and 636.*)

POTTER VERSION. THE ELIMINATION OF THE SECOND STAGE OF LABOR. A REPORT OF 200 CASES*

By M. Pierce Rucker, M.D., Richmond, Va.

AT THE twenty-ninth meeting of the American Association of Obstetricians and Gynecologists, Dr. Irving W. Potter[1] reported 500 cases of internal podalic version, most of which were done for the sole purpose of shortening labor and to avoid suffering. The paper was very adversely criticized, and the Executive Committee considered the principles laid down by the essayist so dangerous that the paper was withheld from publication in the proceedings of the association. The next year Dr. Potter reported an additional 200 cases before the same association, making a total of 700. The discussion of the second paper was scarcely less favorable. There was no criticism of the results obtained. The attack centered in the sentiment that it was unwise to interfere in cases that would deliver themselves spontaneously; that, while Dr. Potter's results were good, the adoption of Dr. Potter's teachings would lead to untold harm.

In the 700 cases reported in the two papers, there was no maternal mortality or morbidity. In fact, the mothers seemed to be better off than the average mother. There were no more lacerations than ordinarily encountered. In the 200 cases of the second paper there were eighteen stillbirths.

The Potter version must be studied from several different angles. First, can others do it with the same ease and success as Dr. Potter? Second, the effect upon the mother; third, the immediate effect upon the child; fourth, the remote effect upon the child. In order to throw light upon some of these points, I have undertaken the present study. The technic that Potter describes and very willingly demonstrates is a very simple one; one that can be carried out either in a hospital or a home. In fact, a large number of his cases are delivered in homes. The first case that I saw him deliver was in the patient's kitchen. The patient was on the kitchen table with her feet resting in two chairs. An ordinary zinc wash tub was between the chairs. A bath towel extended from beneath the patient's buttocks to the tub. The few instruments that he uses, hemostats, scissors, outlet forceps, cord tape, and rubber catheters, were laid out on a sterile towel on the kitchen drain board. He uses an elbow length glove on the left hand and an ordinary rubber glove on the right hand. The patient was deeply under chloroform. A neighbor steadied the patient's knees. He

*Read at a meeting of the Richmond Academy of Medicine and Surgery, September 14, 1920.

lubricated the left hand with liquid soap and dilated the vagina thoroughly. More soap was poured into the birth canal, the palm of the hand acting as a trough to facilitate this. The membranes were stripped from the lower uterine segment. A towel or some convenient sterile cloth was wrapped about the forearm, and kept close against the vulva. The hand was introduced far enough into the uterus to grasp both feet. The purpose of the towel is very evident as soon as the bag of waters ruptures, which usually happens when the feet are grasped. The feet are brought down into the vulva, the version being assisted by the right hand on the mother's abdomen. After the legs are delivered, traction upon the anterior leg causes the back to rotate anteriorly. After a few moment's pause, gentle traction is made on the thighs until a scapula appears under the symphysis. It is sometimes necessary to rotate the body to effect this. Then, with a finger introduced under the pubic arch until it parallels the humerus, he delivers the anterior arm. In a similar manner he delivers the other arm. A finger of the left hand is then introduced into the child's mouth to preserve flexion of the hand, and the head is expressed by pressure on the fundus, just as one expresses the afterbirth. As soon as the face appears, he strokes the mucus out of the baby's throat. The head is then delivered very slowly. The child is laid across the mother's abdomen, and the cord is clamped and cut as soon as pulsation ceases. He gives an ampule of pituitrin immediately after the child is born and then expresses the afterbirth. What impressed me especially, was the ease and deliberateness with which Dr. Potter worked. The first case that I saw him do was a multipara, and he finished it within the classical eight minute period. Later, I saw him deliver a primipara. When he brought out the feet a loop of cord came along with them. I asked him if it were pulsating. There was absolutely no pulsation. He seemed not to worry about this, and was even more deliberate than usual when he saw me timing him. Fifteen minutes elapsed before he delivered the head, and the child breathed spontaneously three minutes later. Dr. Potter in his paper, emphasizes the importance of complete anesthesia. Dr. Reynolds gives the anesthesia in all of his cases both in the home and in the four hospitals in which he works. After having some experience with various kinds of anesthetists, I can see the importance of such an arrangement.

In the cases that I am reporting at this time, we have followed as nearly as possible Dr. Potter's technic with the exception of the routine use of pituitrin. It appeared to me unwise to use anything to cause contraction until the afterbirth had been delivered. Then too, I wanted to see whether versions predisposed to postpartum hemorrhage. In the first cases of our series we followed our usual routine of giving one dram of the fluid extract of ergot as soon as the woman recovered from the anesthesia enough to swallow. Our cases under this procedure

differed in no way from any others that were deeply anesthetized. We then adopted as a means of saving time, the routine of giving a hypodermic of ergotol or pituitrin immediately after the explusion of the placenta.

In order to answer in a measure the criticism that the procedure described by Dr. Potter requires exceptional skill, I have included in this report the cases delivered by myself, by my associate Dr. Carter, and by the fourth year medical students under my direction. Thirty-three cases were delivered at the Spring Street Home for Girls, eighty one were private cases, delivered by myself and eighteen private cases delivered by Dr. Carter, twenty-three were cases delivered in consultation, and forty-five were students' cases.

There were three maternal deaths, one from postpartum eclampsia, one an ether death, and the third from influenza. The first death was that of a white woman, delivered in the out-patient service. She was seen the previous week at the dispensary, where it was noted that she had a funnel pelvis. No urine examination was made. When the students called me, the head had been on the perineum for two hours and she was having almost constant pains. The head was so soft and boggy that both the students and I made a diagnosis of breech presentation by rectal examination, and only after a vaginal examination did we discover our error. The fetal heart could just be heard. It was decided not to lose time necessary to send back to the hospital for forceps, but to deliver the patient by version. This was accordingly done under chloroform anesthesia. It was difficult to get the patient relaxed enough to get the head about the contraction ring, but after this was done the version and extraction was easy. The patient was left at the end of an hour in good condition, except that her blood pressure was 150 systolic, 90 diastolic. Two hours later, the visiting nurse reported that the patient had just had a convulsion. An ambulance was sent to take her to the Virginia Hospital. There was some misunderstanding, and when the ambulance arrived the patient's condition was so good that the ambulance surgeon considered it a call to a normal case, and left the patient in her home. Her convulsions increased in frequency and the patient became comatose. Finally after being unattended for eight hours from the first convulsion, she was taken to the hospital where she died the next day.

The second death was also in the student service. The patient was anesthetized by a hospital interne who had given a large number of anesthetics. I had just made an internal examination and was intent upon directing the student in his search for the baby's feet, when I noticed that the patient was extremely blue and entirely pulseless. Artificial respiration was given for three hours together with hypodermics of caffeine and strychnine. The patient's color became a

bright pink, and several times it looked as though she would recover, but there was never any palpable pulsation.

The third death was a private case who died early in January. She developed postpartum, a cough, high temperature with a few râles, nose bleed, and a leucocyte count of 13,000. Two other cases had pneumonia postpartum. One case developed malaria after delivery, and the plasmodium was found in the blood. Two of my cases showed evidences of profound shock. The first of these was an elderly woman, who had a hemorrhage from the genital tract several days before she went into labor. Her pains were slow and irregular. After she had been in labor a number of hours, I completed manually the dilatation of an almost dilated cervix, and delivered the child. In spite of ergotol and massage of the uterus, she continued to flow rather freely. The cervix was inspected, and found intact. The uterus was packed with iodoform gauze. This controlled the hemorrhage, but not before her blood pressure had dropped to 60 and her pulse had gone to 120, and the patient was complaining that she was unable to get her breath. The patient was given hypodermoclysis and the foot of the bed elevated, and in four or five hours, she seemed to be in good condition. The mother made an uneventful recovery and she and the baby left the hospital in excellent condition at the end of the usual two weeks. This was probably a case of abruptio placentæ with antepartum bleeding and a tendency to relaxation of the uterus after delivery.

The second case was seen in consultation with Dr. Blanton. She also was an elderly multipara. She had albumin and casts in her urine and a systolic blood pressure that averaged about 220 mm. of Hg. By careful treatment she was carried to term. The onset of labor was marked by a severe hemorrhage, followed by a second one several hours later. When I first saw the patient she had lost enough blood to reduce her blood pressure to 180. The cervix admitted three fingers and was almost completely covered over by placenta. Under light chloroform anesthesia, the dilatation was completed manually, and a very easy version and extraction done. The afterbirth was delivered with no difficulty, and was intact. Within thirty minutes, the patient began to feel faint and in a very short while was pulseless. She was given 300 c.c. of saline with one c.c. of adrenalin solution intravenously, and by the time the infusion was finished, had a good color and a systolic blood pressure of 125. This patient also made an uneventful recovery.

One case had infected sutures and ran a little fever for two days. Two cases had well-marked puerperal fever. Both of these had been attended by midwives before the students were called, and in one of them high forceps had been attempted by a colored physician after pituitrin had failed. Two of the cases, including the fatal one,

had eclampsia, and in six others labor was induced on account of intense toxemia. One case had an exophthalmic goiter. There were four cases of placenta previa, one of which was central. Otherwise, there were no maternal complications.

One can but be impressed with the results mechanically. Seven cases had second degree tears, and forty-six, tears of the skin and mucous membrane, in the cases that I have examined four or five weeks postpartum. I have been surprised at the remarkable integrity of the birth canal. In many of them the only indication that they have borne a child, is a slight laceration of the cervix. In one case I was unable to make a vaginal examination with two fingers. Never before have I come so near to discharging my patients in as good condition anatomically.

TABLE I

SHOWING RELATION OF PELVIS TO INFANT MORTALITY

	NORMAL PELVIS	FLAT CONTRACTED	FUNNEL	JUSTO-MINOR	KYPHOSIS (NOT CONTRACTED)	NOT STATED	TOTAL
Breathed spontaneously and lived at least 14 days	112	2	2	0	1	39	156
Resuscitation necessary, lived at least 14 days	9	0	0	0	0	4	13
Died in the first 14 days	8	0	2	0	0	3	13
Stillborn (not macerated)	9	2	0	0	0	5	16
Macerated	3	0	0	0	0	0	3
Total	141*	4	4	0	1	51	201*

*One case of normal pelvis counted twice on account of twins.

The absence of infection and the lessened frequency of injuries to maternal soft parts, excite more comment, and I might say doubt, than anything else in connection with the Potter version. Yet, when one considers the mechanics of the method, in the light of anatomy and pathology, it seems very rational. Potter emphasizes the importance of limiting the number of vaginal examinations. The gloved hand, thoroughly covered with liquid soap, which is germicidal, is introduced into the vagina, and the vagina flushed with green soap. The hand is now carried up into the uterus and into the amniotic sac. The baby is delivered promptly, and the sac in which you have been working, is cast off with a flow of blood that flushes out the entire birth canal. The whole process from the introduction of the hand to the scouring effected by the delivery of the afterbirth, lasts scarcely more than twenty minutes on an average. Compare this with the routine vaginal examination early in labor. In the first place the patient is not in so good a position to observe asepsis, neither is she usually as well prepared as when you have prepared her for delivery. The examining fingers are carried through the same canal

as the delivering hand, without, however, the help of the liquid soap. What bacteria are carried up from the vagina into the cervix, are left for hours, sometimes for days. They have ample time to multiply, to penetrate the fetal membranes and invade the fetal blood vessels,[2] as well as the uterine muscle and blood sinuses, and to become firmly intrenched before the cleansing action of the birth of the placenta occurs. Clinical evidence supports the contention that a single vaginal examination early in labor is more liable to cause infection than any amount of manipulation, short of injury to maternal tissue, at the time of or just before delivery.

As an explanation of the comparatively few and insignificant lacerations, I submit the following: First, the mother is deeply anesthetized, so that the perineal muscles are relaxed and flaccid. Secondly, the posture, a modified Walcher position, with the thighs as close together as possible, relaxes the perineal fascia, as has been shown by Baughman,[3] more than any other position. Third, the vagina is thoroughly stretched and lubricated. Fourth, the aftercoming head will go through a smaller space, as was shown by Sir James Y. Simpson[4] years ago, in discussing the relative merits of version and forceps in contracted pelves. He states that he has often delivered easily by version heads that he could not deliver by long forceps. Fifth, the obstetrician has better control over the advance of the head.

A reference to the appended table will show the relative number of white and colored women in this series, as well as their marital condition, age, the number of children and abortions they have had previously, the blood Wassermann reaction, the character of the pelvis, the position of the child, the duration of the three stages of labor, the method of separation of the placenta, the degree of laceration of the perineum, the condition of the child at birth, its weight in pounds and its length in centimeters, and the complications encountered. The youngest patient in the series was thirteen and the oldest 43. Five of the cases were forty or more years of age. The average age was 29.1 years. The average duration of labor was: first stage 15 hours and 25 minutes, second stage 33.5 minutes, and third stage 9.9 minutes. One hundred twelve patients were primiparæ. Thirty-four cases had aborted one or more times. There is a record of Wassermann reaction in one hundred thirty-one cases. The reaction was positive four times, and seemingly had little effect on the course of labor or the welfare of the child. I encountered a flat contracted pelvis four times and a funnel pelvis an equal number of times. One patient had a marked kyphosis. Of unusual presentations, there were eighteen breech, three shoulder, and one brow. It is surprising to note the number of times the placenta separated by Duncan's method. The method of separation was not noted in thirteen histories. In the re-

TABLE II

ANALYSIS OF CASES WITH SPECIAL REFERENCE TO NEONATAL MORTALITY

	No. of cases	Infant Mortality	
White	163	25	15.33%
Negroes	37	7	18.91%
Married	151	23	15.23%
Single	48	9	18.75%
Widowed	1	0	00
Parity, previous children 0	112	18	16.07%
" " " 1	36	7	
" " " 2	19	2	
" " " 3	10	2	
" " " 4	6	1	
" " " 5	4	0	15.11%
" " " 6	5	1	
" " " 7	2	0	
" " " 8	4	0	
not stated	2	1	
Previous abortions 0	158	22	13.92%
" 1	21	6	
" 2	10	3	
" 3	2	0	25.00%
" 4	2	0	
" 5	1	0	
not stated	6	1	
Blood Wassermann negative	127	20	15.74%
positive	4	1	25.00%
Pelvis, normal	140	19	13.57%
flat contracted	4*	2	50.00%
funnel	4	2	50.00%
kyphosis	1	0	
not stated	51	8	15.68%
Position, L. O. A.	90	12	13.33%
R. O. A.	25	3	12.00%
R. O. P	50	7	14.00%
L. O. P.	11	1	9.09%
occiput unspecified	2	0	
brow	1	0	
breech	18	3	16.66%
shoulder	3	3	100.00%
Separation of the placenta, Duncan	125	19	15.20%
Schultze	62	10	16.12%
Condition of the infant, breathed spontaneously	164	8	4.87%
resuscitated	18	6	33.33%
stillborn (not macerated)	16	16	
macerated	3	3	
premature	15	11	73.33%
postmature	14	10	71.42%
enlarged thymus	2	2	
heart disease	1	1	
hydrocephalus	1	1	

TABLE II—CONT'D

		No. of Cases	Infant Mortality	
Maternal complications,	tuberculosis	1	0	
	influenza and pneumonia	3	0	
	prolapsed cord	3	2	66.66%
	placenta previa	4	1	25.00%
	ablatio placentæ	1	0	
	post partum hemorrhage	1	0	
	puerperal fever	3	0	
	toxemia of pregnancy	4	1	25.00%
	eclampsia	2	0	

*Refused to go to the hospital.

maining 187 cases the separation was by the Duncan method in 125. This is probably due to two factors. Pressure on the fundus in delivering the head likely causes a partial separation of the afterbirth, and the anesthetic, by lessening the uterine contractions in the third stage, may interfere with the usual mechanism of separation of the placenta.

In order to judge the immediate effects upon the child, it is necessary to review the results obtained by other methods and in other clinics. DeLee in his textbook states that over 4 per cent of children died during birth, and quotes Schultze to the effect that 5 per cent of the children are stillborn and 1.5 per cent die very shortly after birth, the result of the trauma of labor. "A large percentage—how large it is impossible to say—is more or less injured, and this, too, in so-called normal delivery. Any one performing autopsies on newborn children will be struck by the frequency of hemorrhages, punctate and larger, in the brain, in the larger ganglia, along the sinuses and sutures. It is certain that such extravasations leave scars, perhaps minute, in the cerebral structures, which may explain some cerebral symptoms later in life." The investigation of the infant mortality of Brockton, Mass., a town chosen for its homogeneousness of population and better-than-average living conditions, by the National Children's Bureau,[5] shows that there were 3 per cent of stillbirths and a mortality of 96.7 per thousand of infants born alive, of which one-third was in the first week of life. Holt[6] states that 25 per cent of the infant mortality occurs in the first month, 11.09 per cent in the first week and 9.64 per cent in the first day. Alcohol, vice, syphilis, and some forms of inherited disease are factors of considerable importance, as well as malformations of heart, intestines and brain, and accidents of birth. Holt and Babbett[7] have studied the records of 10,000 deliveries in the Sloane Hospital for Women and give the following table:

Abortions (less than 37.5 cm. in length)	253
Stillbirths (over 37.5 cm. in length)	429
Living births	9318
Deaths in the first 14 days	291

In the Columbia Hospital[8] in Washington in 10,533 confinements there were 1339 fetal deaths. Coming closer home, we find that in 1918, the last year for which there is available a published report of the Health Department, there were in Richmond 3848 births, 236 stillbirths, and 181 deaths of infants in the first two weeks of life. In other words 6.1 per cent of the infants born in Richmond were stillborn and 4.7 per cent died in the first fourteen days. In the past three sessions there have been 887 deliveries in the out-patient service of the Medical College of Virginia. Of these, 101 resulted in stillbirths, and twenty babies died in the first ten days, a neonatal mortality of 13.6 per cent. The large fetal mortality is explained by the fact that the service is almost entirely among negroes. It is a well-known fact that the infant mortality in the colored race is excessive.

In the two hundred deliveries under consideration there were three sets of twins. In two of the twin cases only the second child was delivered by version. In other words, there were two hundred and one infants that properly come under our consideration in studying the effect of version upon the infant. It should be borne in mind that this series includes most of the difficult cases that I have seen in the past fifteen months. For instance, labor was induced four times for profound toxemia, and in five cases for antepartum hemorrhage. An analysis of the infant mortality will show that with few exceptions, the death cannot be attributed to the method of delivery. Two of the infants were so premature as to be nonviable, weighing 1.5 and 2 pounds and measuring 30 and 32.5 cm. in length. Ten others were premature, according to the standards set by Holt and Babbett, weighing less than five pounds or measuring less than 46 cm. In fourteen cases it was known that the child was dead before delivery was attempted and the version was done in the interest of the mother's soft parts. Two were cases of prolapsed cords in which all pulsation had ceased. Three feti were macerated. Three were neglected shoulder presentations. In two cases of twins the mother had given birth to the first child which was stillborn, and version was done on the second. In three cases the fetal heart had stopped before any attempt was made to deliver the patient. Craniotomy was done twice, both times on dead babies. The first time it was done on account of a marked disproportion between head and the pelvis, and the second time to get the head through a rigid, half-dilated cervix in a case of placenta previa with continued bleeding. There were three other

stillbirths, but in each of these the fetal heart was beating when the operation was begun.

Two cases showed at autopsy a markedly enlarged thymus, and no other lesion. One child, that died on the day of delivery, had extensive vegetations on both mitral and tricuspid valves. This child's mother had a very severe attack of tonsillitis about six weeks before delivery. There was one hydrocephalic fetus in the series, which lived about an hour. One placenta showed a large red infarct. The infant in this case was premature and died on the second day. One premature child died on the eighth day after being badly chilled. Another premature child was born of a syphilitic mother, but at autopsy showed no evidence of syphilis. In one case labor was induced prematurely on account of toxemia of the mother. The child weighed four and a half pounds and died on the second day. One child presented an angioma of the scalp and although apparently at term, was greatly undersized. One infant, delivered after a dry labor, had an extensive intracranial hemorrhage.

This brings us to the class of difficult deliveries, from one cause or another. The first of these was that of a colored woman. Although she had a normal pelvis, I had great difficulty in delivering the shoulders. It was one of my early cases, and I had not learned the knack of rotating the child's body to bring a scapula under the symphysis. I believe now that I would have no difficulty with such a case. Another case caused us great difficulty on account of poor anesthesia. Dr. Carter was doing the version and I was giving the anesthetic. The patient was greatly excited. The house had caught on fire from an oil stove and the fire apparatus, police patrol, and a Saturday night crowd had greatly upset the patient. When the excitement had subsided, and we had the patient back in the house, I was unable to get her relaxed, either with chloroform or ether. The version was on that account very difficult. I believe, now in looking back to this case, it would have been better to have delivered her with forceps. In another case the difficulty was caused by a funnel pelvis and the delivery should have been done with forceps. In three cases the dystocia was caused by large overdue babies. Two of these measured 58 and 60 cm. and the third was described as "tremendous," but was not measured. The ideal treatment for these cases would have been to have induced labor at the expected time of confinement. This was suggested to one of the patients, but was refused. As long as these patients waited until they went into labor spontaneously, it is open to question whether any other method of delivery other than Cesarean section, would have given better results.

In judging the Potter version from the standpoint of the infant, there is a great difference whether the operation is done at the end of the first stage of labor, or later, when some method of delivery is im-

perative. The difference in ease and results reminds one of the difference between elective Cesarean section and section done as a last resort. There were thirty-nine cases in which the second stage lasted for thirty minutes or more. Seven of these infants died, 18.2 per cent. In addition to the fatal cases, one infant had to be resuscitated. We can study the same factor from a different angle by separating the cases into the various services. Those at the Spring Street Home, with three exceptions, fall within the elective group. One of these came into the home in labor and was delivered of a premature baby and a placenta that contained a large red infarct. The second exception was a girl who refused induction of labor at the time she counted to be confined. She went a month over her time, and was delivered of a ten pound baby 58 cm. long. The third exception was a shoulder presentation, who refused bags for dilation of the cervix. The shoulder was jammed down into a hard unyielding cervical canal and the neck stretched out, until the baby died. The only other death at the Spring Street Home was that of a hydrocephalic fetus. Yet, with these cases included, the mortality in the 33 cases is the lowest of any other group, i. e., 12.1 per cent. My next group in electability is that of my private patients. Most of these, especially the earlier ones, required some indication, usually that of severe pain or fatigue, before giving their consent for intervention. In this group the mortality, irrespective of maturity is 14.8 per cent. Dr. Carter's cases, eighteen in all, were less inclined to give their consent for a version, and his mortality is 16.66 per cent. The consultation group of twenty-three cases, usually presented some of the well-recognized indications for rapid delivery. The mortality in this group is 17.4 per cent. The fifth group, or the student cases, is composed very largely of negroes, who have to be nearly dead before they will consent even to an anesthetic. The fetal mortality here is 17.55 per cent.

It is yet too early, of course, to judge of the remote effect upon the child, as my oldest case is only about 15 months of age. The shortening of the second stage is in line with the movement to reduce the number of head injuries. Arthur Stein[9] in 1917 in a paper entitled "The Influence of Labor on the Brain Development of the Child," says: "To delay the application of the forceps, as is the rule of many obstetricians, until the fetal heart sounds become weak and inaudible, means that irreparable damage has often already been done to the infant's brain. In the interest of the child, unduly protracted births should be terminated by judicious intervention." Dr. Frederick Peterson, in discussing this paper, says that the chief cause of palsies occurring during parturition was tedious labor with resulting intracranial hemorrhages. The application of forceps in tedious labor did less injury than the long-continued compression. What is true of palsies, he believes is also true of a number of cases of epilepsy, and the three degrees of

defective mind, namely, feeblemindedness, imbecility, and idiocy. For some time, it has been my practice, in the interest of the child, to interfere in the second stage of labor whenever there is the least hesitation in the progress of the head. In other words with the use of forceps, I have been shortening more and more the second stage of labor. Potter, with his version, has gone a step further, and has practically eliminated the second stage.

CONCLUSIONS

1. The Potter version can be taught to students. It is easier to teach than the use of forceps.

2. It protects the maternal soft parts against undue injuries.

3. In the interest of the child, it should be done gently and deliberately.

4. A competent anesthetist is of prime importance, especially in those cases in which the membranes have ruptured early.

REFERENCES

[1]Am. Jour. Obst., February, 1918.
[2]Slemons, J. M.: Am. Jour. Obst., September, 1918.
[3]Baughman, G.: Trans. Med. Soc. of Virginia, 1912, p. 86.
[4]Leishman's System of Midwifery, p. 520.
[5]Jour. Am. Med. Assn., June 7, 1919.
[6]Holt, L. Emmett: Jour. Am. Med. Assn., February 26, 1910.
[7]Holt, L. Emmett, and Babbett, Ellen C.: Jour. Am. Med. Assn., January 23, 1915.
[8]Moran, John F.: Jour. Am. Med. Assn., December 25, 1915, p. 2224.
[9]Stein, Arthur: Jour. Am. Med. Assn., August 4, 1917, p. 334.

1600 Park Avenue.

THE ADVANTAGES AND DISADVANTAGES OF THE TWO-FLAP LOW INCISION CESAREAN SECTION, WITH A REPORT OF EIGHTY-THREE CASES DONE BY FIFTEEN OPERATORS*

By Alfred C. Beck, M.D., Brooklyn, N. Y.

THE material upon which this paper is based consists of eighty-three cesarean sections, done according to the technic which I first described in the *American Journal of Obstetrics*, February, 1919. As may be recalled this procedure differs from the classical operation in that the uterus is incised in the lower segment, and an extraperitoneal closure of the uterine incision is effected by utilizing two previously prepared flaps of peritoneum.

Brief notes of the eighty-three cases are recorded in Table I. In addition to the name of the operator, these notes give the duration of labor, the number of hours that elapsed between the rupture of the membranes and the time of operation, and the number of vaginal examinations made during labor. As may be observed, most of the operators employed this technic in cases which would have been considered very poor risks for the classical cesarean section. In fact only twelve of the eighty-three operations might be considered elective. The remainder were done either after an efficient test of labor, or vaginal manipulations offered a distinct contraindication to the use of the Sänger operation.

In seventy-four of the eighty-three reports studied, sufficient data were furnished to enable me to show graphically the three factors which usually are considered in the study of morbidity and mortality following cesarean section.

Figure 1 is a graphic representation of the duration of labor. Twenty-three operations were done either before labor or within fifteen hours of its onset. The remainder, or fifty-one of the seventy-four, had been in labor fifteen hours or more.

The condition of the membranes at the time of operation is shown in Figure 2. They were intact in 21 cases, and ruptured in 53. More than ten hours had elapsed between the rupture of the membranes and the time of operation, in 33 cases.

Figure 3 shows the number of vaginal examinations. Only 25 of the 74 patients had not been examined vaginally before operation.

Notwithstanding the presence of these factors which greatly increase the risk of cesarean section, only 3 mothers died. The gross mortality

*Read by invitation at a meeting of the Philadelphia Obstetrical Society, November 4, 1920.

in this series therefore is 3.6 per cent. When we consider the fact that only 12 operations were elective procedures, this mortality is exceptionally low. One of the deaths was due to postpartum hemorrhage two hours after delivery. This patient had an atonic uterus after a prolonged labor. Septicemia was responsible for the second

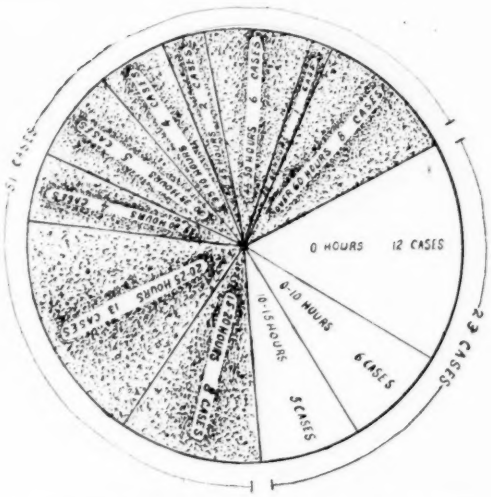

Fig. 1.—Graphic chart showing duration of labor. Shaded area over 15 hours; unshaded, under 15 hours.

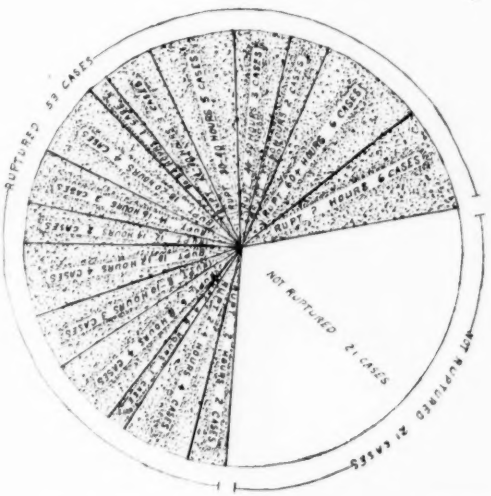

Fig. 2.—Shows condition of membranes. Shaded area, ruptured; unshaded area, not ruptured.

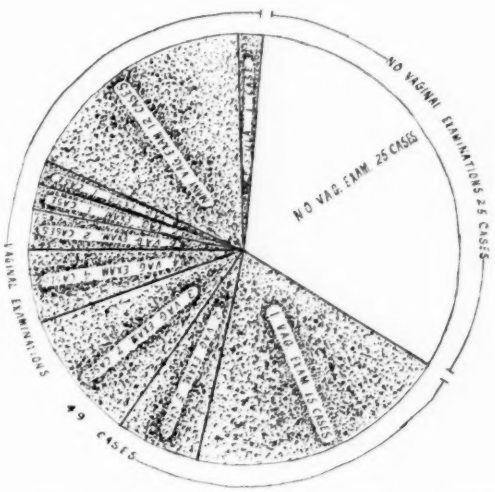

Fig. 3.—Number of vaginal examinations. Shaded area, vaginal examinations; unshaded area, no vaginal examinations.

one. A blood culture on the fifth day showed hemolytic streptococci. The third death occurred on the twelfth day, as a result of peritonitis, which in all probability was due to the transmission of infection through the lymphatics. Only two deaths from infection, therefore,

occurred in the 71 "potentially infected" cases, a mortality from infection of 2.8 per cent in this class of cases.

The anterior surface of the pelvic viscera removed at autopsy from the case which died of peritonitis, is shown in Figure 4. The large adhesion (A) covered the scar of a previous cesarean section. The double flaps were firmly adherent (B) over the site of the incision in the uterus and prevented the escape from the uterus of infected material when the uterine wound broke open. The absence of adhesions over the site of our incision is strikingly contrasted with the presence of dense adhesions over the previous high cesarean wound. Areas on

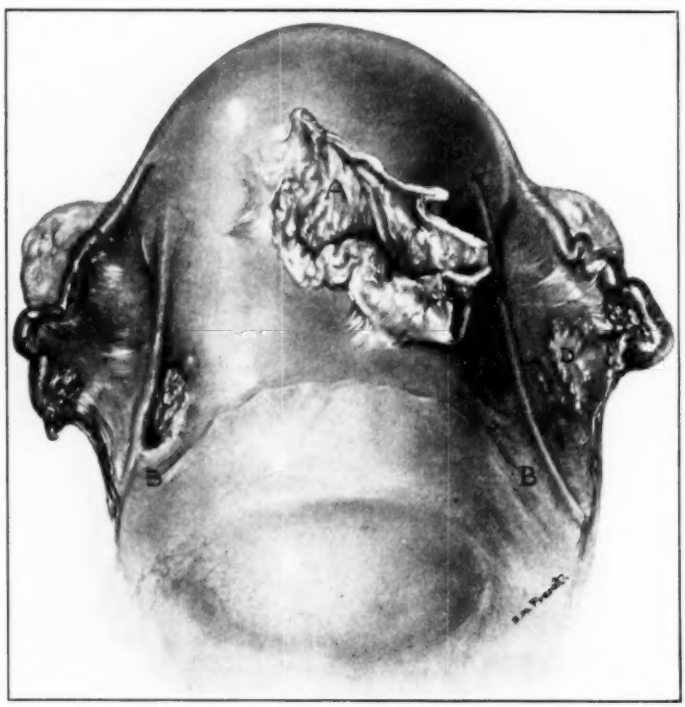

Fig. 4.—Uterus removed at autopsy 12 days after operation. Anterior surface showing (*A*) omental adhesion which was due to previous high Cesarean section. (*B*) Firmly united flaps which sealed the incision in the lower segment. (*C* and *D*) Point through which infection probably reached the peritoneum.

the broad ligaments (C) and (D), show the points through which the infection travelled from the uterus to the peritoneal cavity. The clinical picture, as well as the autopsy specimen, was similar to that seen in peritonitis complicating puerperal infection after delivery through the natural passages.

The original incision in the anterior wall of the uterus (A—B) Figure 5, was open throughout its entire length, while the adherent peritoneal flaps and bladder prevented a communication between the interior of the uterus and the peritoneal cavity. The lower angle of

the wound (B) is so near the external os that drainage of the anterior parametrium through the cervix and vagina is possible when the uterine wound breaks down.

The classical, conservative cesarean section, because of its technical simplicity and the excellent results which have followed its use in properly selected cases, is regarded almost universally as the standard method of suprapubic delivery. The advantages of any new procedure over this accepted technic, must, therefore, be definitely proved and

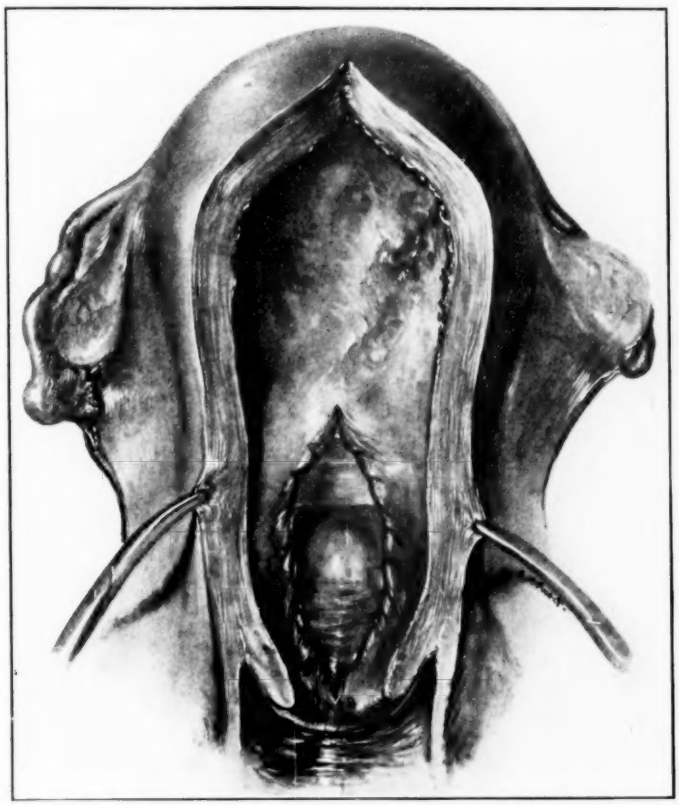

Fig. 5.—Posterior wall incised, showing site of operations. The uterine wound *A* to *B* broken down throughout its entire length. Bladder and adherent flaps prevented contamination of peritoneal cavity when the uterine wound broke open.

greatly outweigh its disadvantages if such a procedure is to survive the enthusiasm which attended its introduction. A considerable experience with the classical operation and the Krönig technic enables us to compare the advantages and disadvantages of the two flap low incision cesarean section, with those of the accepted procedure.

EXPOSURE OF THE FIELD OF OPERATION

The field of operation is more easily exposed when the classical operation is done. In our procedure the difficulty of exposure is less

than that encountered in the usual pelvic operations and is greatly diminished by the use of the Trendelenburg posture whenever the bladder reflection is below the level of the lower angle of the abdominal incision. As this area rises with the progress of labor the field of operation is easily exposed in those cases done some hours after the onset of labor.

TECHNICAL DIFFICULTIES

The dissection of two flaps of peritoneum makes our technic somewhat more difficult. It likewise might be inferred that injury of the bladder is possible. In the hands of one familiar with abdominal hysterectomy this added technical difficulty should be quite insignificant. (Because of the occasional need for hysterectomy immediately after cesarean section, the latter operation should not be undertaken by those who are not capable of doing the former.)

EXTRACTION OF THE CHILD

Section through the fundus of the uterus permits easy extraction of the child. If the presenting part is not fixed in the pelvic brim, the same may be said for the low procedure, provided an ample incision is made. Preliminary disengagement by rectal or vaginal manipulation, or the use of forceps, will facilitate delivery in the difficult cases. Since the incision is in the lower segment, no great haste is required for the delivery, after entering the uterine cavity. The risk to the child, therefore, is not increased by the employment of our technic.

CONTROL OF HEMORRHAGE

In the low operation the placental site is encountered much less frequently than in the high. The former as a result is accompanied by less hemorrhage. Sampson's work shows the area incised in the two flap low incision technic, to be supplied by the terminals of the smaller arcuate arteries. If the midline is followed, very little hemorrhage should occur. This area is much less vascular than that incised in the Sänger operation as is shown in Sampson's x-ray pictures of an injected uterus.

Whenever it is impossible to secure proper contraction of the uterus after the delivery of the placenta, and hysterectomy is indicated for the control of hemorrhage, this operation can be better and more easily done after our procedure, since the lower segment is already exposed and the bladder flap has been previously dissected, an advantage of inestimable value, as in these cases the condition of the patient usually is poor and demands a quick hysterectomy.

Postpartum hemorrhage should not occur after a low cesarean section because postpartum relaxation may be detected and treated as

easily as after a spontaneous delivery, since the abdominal dressings are wholly below the umbilicus and permit the nurse to feel the uterus at all times.

ABDOMINAL ADHESIONS

Following the classical operation adhesions between the uterine incision and the omentum, intestines, and abdominal wall frequently occur. While we have not opened the abdomen of any of our patients who have been delivered by our operation and as a result cannot prove the absence of adhesions, it would seem that the low incision plus the better peritonization, should be followed by fewer adhesions. Bimanual examination one month after operation invariably has shown the uterus to be in excellent position and freely movable, a condition which points towards the absence of adhesions.

POSTOPERATIVE CONVALESCENCE

Because of the location of the field of operation the intestines are seldom seen and never disturbed when our technic is employed. Troublesome complications are usually absent. In fact, the convalescence is quite like that which follows a prolonged labor.

STRENGTH OF THE UTERINE SCAR

In the few cases that have returned for delivery after a previous low cesarean section, the old scar showed no evidence of weakness. The incision is through the same tissues cut in a vaginal hysterectomy and since we have noticed no ruptures following that operation, it is reasonable to assume that the scar in the lower segment is fully as strong as that in the upper. From the fact that the lower segment is passive, it would seem that better union should occur in this region. If, as suggested by Finlay and others, rupture of a previous cesarean scar is influenced by the implantation of the placenta over the site of the previous incision, a scar in the lower segment below the usual level of the placental site is less liable to be weakened by the erosive action of the villi.

DURATION OF THE OPERATION

When our technic was first employed, fully one hour was necessary for the completion of the operation. Greater familiarity with the details has reduced this period to thirty minutes in some cases. Since the classical cesarean section can be completed in from 15 to 20 minutes, the advantage in this respect unquestionably belongs to the latter. If the operator lacks dexterity, or the condition of the patient is such that the addition of a few minutes to the duration of the operation is detrimental, the element of time must be considered. The average surgeon, however, will not regard the extra few minutes re-

quired by a more perfect technic, as a serious disadvantage, when the patient's condition is good.

PROTECTION AGAINST PERITONITIS

Peritonitis following cesarean section is the result of one or more of the following factors: (1) A faulty aseptic operative technic. (2) The "spilling" of contaminated amniotic fluid. (3) Extension of a uterine infection through the lymphatics. (4) The transmission of virulent material through an infected uterine wound, which has developed in the course of a puerperal infection. While the first three modes of infection are possible, *the usual source of peritonitis is through the uterine wound,* and the clinical course is that of a puerperal infection followed by a sudden development of peritonitis due to the leakage of pus into the peritoneal cavity.

Our operation, by placing the incision in the lower segment and doubly sealing it with flaps of peritoneum, offers a two-fold barrier against the usual mode of extension of infection from the uterus to the peritoneum. The greater part of the uterine wound sinks into the pelvis immediately after its closure. Should infection extend through this wound, we may anticipate localization in the pelvis, rather than contamination of the whole peritoneal cavity. In addition to the advantage gained by the more favorable location of the incision, the double flaps offer an added protection. Within a short time after operation, these flaps become adherent and make the wound extraperitoneal. In the event of infection, they are sufficiently united by the time that the uterine wound breaks down, to protect the peritoneal cavity from contamination. Infection is thereby limited to the subperitoneal tissues from which drainage occurs spontaneously, either through the lower angle of the abdominal wound or through the separated edges of the uterine wound into the cervix and vagina.

The transmission of infection through the lymphatics or by the spilling of contaminated amniotic fluid is not avoided by the two flap low incision cesarean section. However, since these are the least frequent sources of peritonitis, the mortality following the procedure advocated in this paper will be considerably lower than that following the Sänger operation in potentially infected cases.

SUMMARY

The shorter duration of the operation, the ease of exposure, the fewer technical difficulties and the less troublesome delivery of the child, are points in favor of the classical operation, and may be regarded as disadvantages of the double flap low incision section. These disadvantages, however, scarcely warrant consideration if further experience with our procedure continues to show that it offers better protection against hemorrhage, peritonitis and adhesions, and is followed by an earlier convalescence and less risk of rupture during a subsequent pregnancy.

TABLE I

HOSPITAL NUMBER	PATIENT'S INITIALS	OPERATOR	HOURS IN LABOR	MEMBRANES RUPTURED IN HOURS	VAGINAL EXAMINATIONS	PUERPERIUM
L.I.C.H.						
1918						
6374	R. W.	J. O. Polak	27	6	3	febrile
6467	V. P.	A. C. Beck	5	0	0	afebrile
1919						
71	A. S.	J. O. Polak	64	18	1	afebrile
858	L. S.	A. C. Beck	48	?	0	afebrile
1151	S. J.	J. O. Polak	13	0	0	afebrile
1403	L. E.	J. O. Polak	4	0	0	afebrile
1831	P. S.	J. O. Polak	13	0	0	afebrile
2120	S. P.	J. O. Polak	4	0	0	afebrile
3130	M. B.	J. O. Polak	0	14	1	afebrile
3297	I. P.	J. O. Polak	0	0	0	afebrile
3326	R. G.	J. O. Polak	0	48	1	infection
3777	M. F.	J. O. Polak	0	48	0	febrile
4167	E. L.	J. O. Polak	48	?	Bag	afebrile
4301	R. B.	J. O. Polak	36	36	1	infection
4476	K. R.	A. C. Beck	48	48	1	afebrile
5239	A. T.	A. C. Beck	36	36	1	febrile
6085	L. W.	A. C. Beck	31	3	0	afebrile
6280	H. B.	A. C. Beck	10	0	0	afebrile
6282	H. B.	J. O. Polak	6	3	fistula	infection
6759	L. W.	J. O. Polak	24	0	0	febrile
6831	F. S.	J. O. Polak	29	72	1	infection
L.I.C.H.						
1920						
311	M. S.	W. A. Jewett	24	18	4	afebrile
782	R. K.	J. O. Polak	0	0	0	afebrile
902	C. L.	T. S. Welton	24	20	many	febrile
910	J. B.	W. P. Pool	24	60	many	febrile
919	A. K.	J. O. Polak	26	6	1	febrile
1348	A. F.	A. C. Beck	17	12	0	afebrile
1427	E. M.	A. C. Beck	55	50	0	afebrile
1862	R. M.	A. C. Beck	68	32	4	febrile
2095	Y. H.	J. O. Polak	36	36	0	febrile
2265	E. G.	A. C. Beck	24	6	0	febrile
2320	S. V.	J. O. Polak	0	0	0	afebrile
2402	G. F.	W. P. Pool	20	10	3	febrile
2460	L. B.	J. O. Polak	0	0	0	afebrile
2614	A. F.	A. C. Beck	24	4	0	afebrile
2757	A. K.	J. O. Polak	26	24	1	afebrile
2886	D. S.	A. C. Beck	72	14	arm prolapsed	febrile
2973	S. L.	R. M. Beach	70	72	6	febrile
3124	V. M.	J. O. Polak	0	0	0	febrile
3305	G. N.	G. Gibson	48	60	many	febrile
3692	J. K.	J. O. Polak	17	0	1	febrile
3877	P.	A. C. Beck	72	18	16	febrile
4340	B. F.	A. C. Beck	16	10½	0	afebrile
....	M.	W. A. Jewett	33	9	2 forceps	febrile
J. H.						
53373	R. S.	L. S. Schwartz	48	36	3	infection
54175	E. M.	L. S. Schwartz	29	72	1	infection

TABLE I—CONTINUED

HOSPITAL NUMBER	PATIENT'S INITIALS	OPERATOR	HOURS IN LABOR	MEMBRANES RUPTURED IN HOURS	VAGINAL EXAMINATIONS	PUERPERIUM
56430	R. S.	L. S. Schwartz	12	12	many	afebrile
57889	I. B.	L. S. Schwartz	64	61	1	infection
58536	R. S.	L. S. Schwartz	24	0	many	infection
58967	S. S.	L. S. Schwartz	18	?	many	afebrile
59063	M. R.	L. S. Schwartz	24	0	many	febrile
W. H.						
17138		T. S. Welton	0	0	many	febrile
17598		T. S. Welton	42	24	many	febrile
G. H.						
12626		T. S. Welton	72	?	6	afebrile
12842		T. S. Welton	32	7	0	febrile
12877		T. S. Welton	24	10	3	febrile
12950		T. S. Welton	32	24	many	febrile
14071		T. S. Welton	16	9	2	febrile
14158		T. S. Welton	36	10	2	afebrile
14518		T. S. Welton	0	0	many	afebrile
14612		T. S. Welton	72	50	many	febrile
B. H.						
	J. H.	Harold Bailey	24	1½	3	febrile
	B. K.	Harold Bailey	17	8	3	febrile
	J. P.	Harold Bailey	0	0	1	afebrile
S. H.						
9890	M. B.	W. A. Jewett	21	12	7	febrile
C. L. I.		J. B. De Lee	0	?	0	afebrile
L.I.C.H.						
1920						
5712	R. H.	A. C. Beck	20 plus	15	2	afebrile
5621	D. B.	H. B. Matthews	46	?	0	febrile
....	B.	A. C. Beck	40	18	4	febrile
....	M. E.	E. B. Piper	24	0	5	febrile
1459	L. R. R.	C. S. Fleming	18	3	2	febrile
1543	T. J.	C. S. Fleming	8	0	3	febrile
1732	F. X. F.	C. S. Fleming	10	2	1	afebrile
2410	A. W. P.	C. S. Fleming	24	4	2	afebrile

3 cases by .....John Mc. Glynn ....All unsuitable for the classical operation.
6 cases by .....Richard Norris ..... All unsuitable for the classical operation.

The author is indebted to the following colleagues for permission to include their cases in this report:—namely, Drs. H. C. Bailey, New York (3 cases); R. M. Beach, Brooklyn (1); J. B. DeLee, Chicago (1); C. S. Fleming, Fairmont (4); C. Gibson, Brooklyn (1); W. A. Jewett, Brooklyn (3); H. B. Mathews, Brooklyn (1); J. O. Polak, Brooklyn (23); W. P. Pool, Brooklyn (1); E. B. Piper, Philadelphia (1); L. S. Schwartz, Brooklyn (7); T. S. Welton, Brooklyn (11).

20 LIVINGSTON STREET.

(For discussion, see p. 636.)

A CRITICAL STUDY OF 270 CASES OF DRY LABOR*

By Franklin A. Dorman, M.D., and E. C. Lyon, Jr., M.D.,
New York, N. Y.

EVERY practitioner of obstetrics has in his mind an indictment of "dry labor." The laity shares this prejudice. The writers of textbooks frame their charges in no uncertain tones. Jewett says: "If by mischance early rupture of the membrane has occurred and the waters have drained away, such labors are proverbially liable to be of long duration and prejudicial to mother and child." Cragin, in his textbook, page 209, says: "Sometimes rupture of the membrane occurs several days or even weeks before the onset of labor, but as a rule labor pains begin within twenty-four hours. Several cases have come under my observation in which, after the escape of liquor amnii, the long pressure upon the child and the entrance of air to the amniotic sac has apparently caused the death of the child and infection of the mother. It is my custom to start the induction of labor in a patient whose pains do not begin in twenty-four hours after the rupture of the membrane." This was a standing rule at the Sloane Hospital at the time when the authors were residents there.

Dr. Lee states that "when the bag of waters ruptures before labor, especially in primipara, these are called dry labors and are usually long, tedious, and painful. Operative interference is often necessary in dry labors."

Wright states that "the so-called dry labor is, in a large proportion of cases, a protracted labor, nearly always accompanied by serious symptoms and frequently followed by disastrous results. Dangers to the mother are: exhaustion from long-continued pain, with tetanic contraction of the uterus, rupture of the uterus, laceration of the cervix, vagina, pelvic floor and perineum; various forms of fistulæ; post partum hemorrhage, pulmonary thrombosis, septicemia. The dangers to the child are chiefly asphyxiation and meningeal hemorrhage."

Peterson: "Dry labor is attended with a notable increase in the maternal and fetal hazard."

Edgar in his textbook on Obstetrics says that "premature rupture is not necessarily due to any intrinsic peculiarity of the membrane, but to anomalous conditions elsewhere (contracted pelvis, shoulder presentation). A certain proportion is thought to be of endometric origin. Early rupture of the membranes is of frequent occurrence but the condition is not invariably dystocic, because the amniotic fluid

*Read by invitation at a meeting of the Buffalo Academy of Medicine, January 18, 1921.

does not necessarily all escape. When it is completely evacuated, the dystocic condition known as 'dry labor' develops. The loss of the water wedge before the completion of dilatation brings the head of the fetus in direct contact with the cervix. This tends to induce a tetanoid action of the uterus and works injury to the cervix. The latter becomes greatly elongated and its anterior lip often edematous. Laceration is very common. Compression of the fetal head causes a tendency to asphyxia and intracranial hemorrhage. The tetanoid action of the uterus combined with the edematous cervix retards the first stage of labor and exhausts the mother. Premature rupture is greatly dreaded in anomalous presentations and contracted pelves,—conditions under which it is especially prone to occur. In such cases it contributes a further element of dystocia."

Williams in his textbooks, states concerning dry labor: "This accident occurs occasionally in primipara and not infrequently in multiparous women before the onset of uterine contractions and gives rise to what is designated as 'dry labor,' which is usually unduly prolonged and very painful. The delay is due in great part to the absence of the hydrostatic action of the bag of waters, in consequence of which the changes in the cervix must be brought about almost entirely by the presenting part, * * * a dilating wedge of imperfect shape and consistency. This complication is usually not so serious in multiparous as in primiparous women, since in the former, labor, as a rule, sets in within a short time of the discharge of the liquor amnii. Occasionally, however, days, and in rare instances even weeks, may elapse before it occurs. * * * The premature opening of the amnion greatly increases the danger of intrapartum infection."

Hirst: "If the membranes are too thin, they may rupture prematurely, and this gives rise to what is called a 'dry labor,' in which the birth canal must be dilated by the hard, unyielding presenting part instead of by the bag of waters. Such labors are longer and more painful than the average and there is greater likelihood in them of lacerations of the cervix and a more frequent demand for * * * forceps."

The question thus not infrequently arises as to the duty to the patient with membranes ruptured, not in labor, or to the patient with membranes ruptured and in labor, when progress is slow and the cervix incompletely dilated. Does the drained uterus add material risk to the child? Can the danger from cord or body pressure be lessened by active interference? What is the increased liability to uterine infection from access of air to the drained uterus? From the lengthened labor? Does interference such as the use of the bag or bougie improve the results? To what extent is operative termination of these labors necessary?

To the authors it has seemed that the intensive study of cases of dry

labor might be of value in furnishing a definite answer to some of these questions. For this analysis, a carefully kept record of a series of two thousand cases delivered at the Woman's Hospital was used. From these were selected all cases in which the membranes had ruptured twelve hours before delivery and in which the child had an intrauterine development of more than six and a half months. As it is recognized that certain women whose labors start with ruptured membranes, with a dilated and dilatable cervix, have an expeditious labor, such cases were ignored.

From the two thousand histories there were collected two hundred and seventy cases of prematurely ruptured membranes in women with viable infants, in which the rupture occurred at least twelve hours before delivery. This gives us an incidence of clinically significant dry labor cases of 13.5 per cent. The proportion of primigravida was somewhat more than that of multigravida. This is in marked contrast to the general hospital ratio of five primiparæ to four multiparæ, showing a somewhat greater tendency to dry labor in primiparæ. It is possible that these figures indicate merely a greater probability of protracted labor in primiparæ when premature rupture occurs.

The most constant factor in the causation of dry labor seemed to be deformities of the pelvis, of which there were 7+ per cent of the whole. It is believed that a more careful study of the cases would have demonstrated a still larger proportion of pelvic abnormalities, as 39 per cent of the multiparæ gave a history of previous complicated labors. Four had had previous stillbirths. It seemed impossible to get any definite data as to the thinness of membranes or as to any pre-existing endometrial abnormality. Three of the cases were partial placenta previas, which might account for an irregularity in the tensile strength of the membranes.

Premature labors were 10 per cent of the whole, but as two-thirds of these were preceded by the ruptures, we cannot concede prematurity as frequently an essential cause for ruptured membranes. A maladjustment of fetal parts, such as breech or transverse, was found in 4 per cent of the cases. Twins occurred three times, which is about the normal incidence. Twice the membranes were ruptured by the introduction of bags, and once they were ruptured as a therapeutic measure in accidental hemorrhage.

As a possible condition favoring early rupture, it would seem that an unusual rigidity of the cervix, which is sometimes found in dry labor, might be the cause instead of the result of the accident. This tendency might also apply to a cervix cicatrized from previous injury or operation. A cervix that dilates prematurely, without labor, undoubtedly predisposes to premature rupture. But in the absence of other causes of dystocia, labor in these cases should progress with celerity.

Our first study was of the relation of time of rupture to onset of labor. We found that approximately two-thirds of the cases (59 per cent) ruptured before labor; one-third (28 per cent) ruptured after the commencement of labor; and one-sixth (14 per cent) were reported to have rupture occurring with onset of pains. This gives us a ratio of 4:2:1.

In the first classification there were found twenty-five cases where rupture had occurred from thirty to one hundred and twenty hours before labor pains. The average length of labor in these cases was computed and found to be ten and a half hours. One half were under eight hours. The length of time that the uterus remained drained did not particularly affect the duration of labor.

For purposes of comparison the average morbidity and fetal mortality of this class of cases is compared with other classifications.

	MORBIDITY	FETAL MORTALITY
	%	%
All hospital cases	17.5	5.5
All cases of dry labor (270)	26.0	8.4
Cases with rupture 30+ hours before pains (25)	20.0	8.0
Cases with rupture 30+ hours before delivery (47)	19.0	8.5
Cases with 30+ hours labor (53)	34.0	15.0
Cases with labor under 10 hours (27)	27.0	5.0

In this connection the report of a private case is of interest. Mrs. H. E., thirty-nine years old. Previous labors, three: First 14 years ago, high forceps; second and third, low forceps, each followed by post partum hemorrhage. Date of expected labor, November 23, 1915. On November 26, the membranes ruptured. For four days there were no pains. Had the patient consented to hospital care I should, as was my custom at that time, have inserted a cervical bag. Under the circumstances, we simply delayed interference. November 30, four days later, pains commenced. Labor was normal up to the perineal stage, when forceps were used for inertia. Total labor, thirteen hours. The child was in good condition, weighing about nine pounds. The mother's recovery was without fever or other complications.

The second class of cases, i. e., those that ruptured after the onset of labor, showed thirteen cases of labor protracted to thirty hours or more, furnishing 23 per cent morbidity and 15 per cent of fetal mortality.

Those cases rupturing with onset of pains gave 11 per cent of morbidity and no fetal mortality.

These figures bring us to the inevitable conclusion that the length of time that the uterus is drained is a negligible factor in the causation of morbidity or mortality; but that the length of labor is an important reason for both complications.

Vaginal examinations, while offering a risk in all cases of labor, might be considered a greater menace in cases with ruptured membranes. All cases recording more than three vaginal examinations were studied—twenty-nine in all. The figures showed the startling morbidity of 52 per cent. The cases with no recorded vaginal examinations gave a morbidity of less than 25 per cent.

It is fair to state that in our morbidity figures all cases having a rise of temperature were included except those obviously explained by some cause other than pelvic. Thus every case of so-called "reactionary temperature" with a rise to 100.4° F. is listed. Evidently the cases not examined were uncomplicated and less protracted.

The operative treatment of dry labor, aside from the termination of the cases, consists in the use of the Voorhees bag for induction of labor or as a substitute for the bag of waters in expediting dilatation. The bags were used in twenty-five cases. In eleven, the chief purpose was to induce labor. Four special indications for induction were: eclampsia, toxic albuminuria, accidental hemorrhage, and placenta previa. In fourteen cases dilatation was desired in cases already in labor. Two of these had partial placenta previa.

In all bag cases the morbidity was 32 per cent; fetal mortality, 20 per cent.
Cases with dry labor the only indication, 26 per cent; fetal mortality, 21 per cent.
Contrast with all dry labors, morbidity, 26 per cent; fetal mortality, 8.5 per cent.

In so far as the figures from so few cases can be used as an index, the employment of bags did not reduce the maternal morbidity and appeared unfavorable to the safety of the fetus. Of the five children lost, three were deaths (one premature) and two were stillbirths, both premature. One prolapse of the cord occurred as a complication of the use of the bag but did not result in the loss of the fetus.

The termination of these bag labors results in eleven, or 44 per cent, of operative deliveries, as follows: forceps; 1 high, 4 medium, 5 low,—and one cesarean, with hysterectomy for fibroid uterus.

The operative termination of all dry labors was 28 per cent, not including breech deliveries.

The recorded average labor after the induction by bags was thirteen and three-quarter hours, with a percentage of operative endings of 54.5 per cent.

The study of the delivery of the dry labors brought out some interesting figures. If we include breech labors with our operative deliveries, nearly one-third of the births required artificial assistance. Sixty-four of the operations were forceps, five high, thirty medium, twenty-nine low. To these might be added two cases of the application of forceps to the after-coming head in breech deliveries. The indications as given were: deformed pelvis, 16 cases; inertia, 12; persistent occiput posterior, 12; over-sized child, 6; rigid cervix, twice; tonic

uterus, once. In two cases, manual dilatation was employed, followed by a primary trachelorrhaphy.

The maternal morbidity was 28 per cent, with fetal mortality of 11 per cent, each 2 per cent higher than the average of the whole series of cases.

There were thirteen breech labors, two occurring in twin pregnancies and two in premature labors. The operations included two forceps, two breech extractions, one version from vertex for placenta previa, and one craniotomy on an after-coming head, with the child dead and the head held by a rigid cervix. Morbidity was 46 per cent; fetal mortality, 24 per cent. Lengthened dry labor in breech cases is therefore much more serious than in vertex cases. Furthermore, the proportion of breech labors in dry labors is more than twice the normal incidence.

The cesarean operation was used eight times,—for the following indications: six cases of disproportion, and two others with fibroids obstructing. There was one stillbirth in the case of a patient sent in with ruptured uterus. Two cases had a hysterectomy combined with the section, one with the ruptured uterus and one for fibroids.

Six of the eight patients had some temperature (one going as high as 105°) but all recovered. All these patients averaged over thirty hours with ruptured membranes. One case (No. 1176) had undergone forty hours labor and five vaginal examinations. At the time of operation the temperature was 101.4°. For ten days post partum there was fever, rising to 103° as maximum.

Another case was a private patient, Mrs. B, thirty-nine years old, i-para. The membranes ruptured 36 hours before operation. There were two vaginal examinations. At the last, the cervix was high and thick, with the os admitting one finger. There was no evidence of pains. A flattened thickening to the left of the cervix showed a fibroid. When the uterus was incised, there was a distinct fetid or stale odor to its contents. The uterine cavity was swabbed with iodine, and the uterus and abdominal wall were closed without drainage. In the first twenty-four hours the temperature rose to 101.4°, and again on the sixth day to 101.2°. Otherwise recovery was normal, with primary union.

It is interesting to note in spite of the high morbidity that this series was free from maternal deaths. The inference would be that the drained uterus, even if existing for many hours, does not give the serious contraindication for Cesarean operation that has been maintained by many, especially if the examinations have been carefully used and other operative interference not attempted.

The study of the puerperal morbidity of our series gave 82 cases with temperature above 100.4°. From these we may subtract ten mastitis cases, leaving 72 cases in which we may ascribe fever to the labor.

They were divided as follows: 56 sapremic or septicemic; 12 reactionary; 3 postoperative (after laparotomy); and one eclamptic.

Taking these 72 cases as the morbidity of the series, there is a total morbidity of 26 per cent, which compared with the average hospital morbidity of 17.5 per cent, gives us a fair estimate of the maternal increase of risk in dry labor. Excluding reactionary eclampsia and postoperative temperatures, the morbidity is 21 per cent.

Of the sapremic, 29 were nonoperative. In searching for possible reasons for fever, there were ten cases with labor over twenty hours; seven cases with membranes ruptured a considerable time before entering the hospital; four cases of post partum hemorrhage; and three cases with several vaginal examinations.

Only eight of the sixty infected cases had fever above 102°; and the average duration of fever was eight days. These eighteen we might call the seriously infected cases, one in fifteen. Three of them had no recorded vaginal examination, but had ruptured membranes some hours before admission. The other fifteen cases averaged three vaginal examinations. Eleven of them were operative deliveries. Three had post partum hemorrhages. Three of the eighteen had ruptured membranes before entering the hospital.

The one case of maternal mortality ruptured her membranes six hours after admission to the hospital,—twenty-five hours before delivery and eleven hours before labor. Two hours after the membranes ruptured, the patient had a chill. Following this, labor was induced by a bag. Twelve hours before delivery there was fever to 101.6°, increasing to 102.6° at delivery with pulse 148. On the third day the temperature was 102°. The fever ran a septic course until the patient's death on the twenty-sixth day. The premature child, weighing four and a half pounds, died on the third day. At birth it had a temperature of 105.6°. Infection here would seem to have occurred before the introduction of the bag. It showed a remarkably rapid onset after the rupture of the membranes.

An example of intrauterine contamination with fever antepartum is illustrated in case No. 315, Mrs. A. K., para i. Membranes ruptured while at home. Eight hours later, pains began. Sixteen hours later she walked in the hospital. Pains were moderate, every twenty minutes. There was fever, 101.2°, pulse 104. An occiput posterior was manually corrected, with birth about an hour later. The baby was covered with foul-smelling vernix. Placenta and fluids from uterus were also offensive. The puerperium was normal, without fever.

In another case, Mrs. C., private patient, para iii, membrane had been ruptured for 48 hours, when bag was inserted. Birth of child followed expulsion of bag, 21 hours later. At the time of delivery the mother's temperature was 101.6°. She ran an irregular fever up to the twenty-

first day, when a deep femoral abscess, due to phlebitis, was incised and drained.

The total mortality of 273 infants was twenty-three, or 8.4 per cent. This may be compared with the general hospital mortality of 5.5 per cent. There were eleven stillbirths, in which the probable causes contributing to death were: 4 forceps; 3 prolonged labors; 2 premature labors with placenta previa; 1 breech labor with rigid cervix; 1 unknown.

Of the twelve deaths, there were three forceps; six premature labors; two cases of atelectasis, and one congenital intestinal obstruction.

Dry labor therefore may be considered to increase the fetal mortality hazard three per cent.

In summarizing our conclusions, we should state that our deductions are necessarily confused by the fact that many of our cases had other reasons for prolonged labor, fever, and infant mortality than ruptured membranes. In other words, that obstetrical complications seem to be a cause for dry labor nearly as frequently as dry labor seems to be a cause for complicated labor.

It would seem established, however, by these figures that the length of time during which the membranes are ruptured before labor is not an important factor, either in prolonging labor or in producing morbidity or fetal mortality.

Protracted duration of pains in dry labor, on the other hand, greatly increased the morbidity and tripled the fetal mortality.

The morbidity risk increased consistently in proportion to the number of vaginal examinations. There can be no doubt that every vaginal examination in the patient with ruptured membranes is a dangerous procedure. The rectal touch should be employed as much as possible.

The use of the dilating bag, even when employed to induce labor, did not reduce morbidity and seemed unfavorable to the fetus. With an operative termination in 54 per cent of such induced labors, and an average labor of over twelve hours, the question arises whether induction of labor by bags is justifiable.

Dry labor requires operative termination in one-third of the births.

The risks of breech labor are much greater if the membranes are ruptured early.

The cesarean operations in the series gave very good results, despite the grave prognosis usually given to abdominal hysterotomy in dry labor.

Finally, we may sum up the condition of dry labor as increasing puerperal morbidity 8.5 per cent and fetal mortality 3 per cent, the dangerous elements being prolonged labor, intrauterine contamination (usually from vaginal examinations), and the operative terminations.

133 East Fifty-seventh Street.

FIBROMA OF THE OVARY*

By Edmund D. Clark, M.D., F.A.C.S., and William E. Gabe, M.D.,
Indianapolis, Ind.

FIBROMA of the ovary is a sufficiently rare condition to warrant the report of all carefully studied cases. Such tumors of the ovary were probably first mentioned by John Astruc in his lectures in 1740 at Paris, published in London in 1743: "Nevertheless, such tumors, and particularly scirrhous ones, are not very frequent in those organs" (the ovaries and tubes). Fullerton states that they were first discussed as early as 1749. A perusal of the statistics of large clinics or of men having extensive experience in pelvic surgery shows a surprisingly small number of true ovarian fibromata. The United States Army Medical Museum contains only eight specimens (Lamb). Sir Spencer Wells, in 1200 ovariotomies, found only three ovarian fibromata (Peterson). Kelly, in 1200 laparotomies, found four; and Loehlein in a series of 172 ovarian tumors found seven (Laidley). Thornton, in 500 cases of pelvic tumor, saw only three (Coe). Olshausen found six in a series of 293 ovarian tumors, while Orthman saw ten in 527. Hellman, in his excellent paper on the subject, reports six cases found out of a series of 4500 pathologic specimens covering a period of about ten years at the Frauenklinik of the Königliche Charité in Berlin.

We desire to report the following case:

E. C.; single; aged forty-six; was referred by Doctor Haws, of Advance, Indiana, for surgical treatment of a tumor in the lower abdomen. The family history is irrelevant. The patient had the usual diseases of childhood, and pneumonia at the age of twelve. She had occasional frontal headaches which were relieved by glasses at the age of thirty-two. Five years ago she had an attack of pain in the left lower quadrant of the abdomen. The pain was not exceedingly sharp and was not associated with vomiting, diarrhea, or constipation. She had with this attack some dysuria. Shortly afterwards she noticed a growth, a "hardness," as she expresses it, across the lower abdomen and that the latter was gradually increasing in size. Recently she had another attack of pain in the left lower quadrant of the abdomen and consulted her physician. He found a tumor to be present and referred her for surgical treatment. The patient's menstruation had been normal all her life, her periods starting at the age of fourteen and the menopause occurring five years ago, just before the onset of the present trouble.

Physical Examination.—The patient is fairly well developed and nourished. Aside from a few carious teeth and considerable pyorrhea, the head is negative. The heart, lungs and extremities reveal nothing pathologic. Palpation of the abdomen, over its lower part, reveals a mass about the size of an ordinary grapefruit situated a little to the left of the midline just above the symphysis pubis. There is some

*Read at the Thirty-third Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Atlantic City, N. J., September 20-22, 1920.

tenderness present in this region. No demonstrable ascites can be made out. Bimanual examination shows this mass to be nearly spherical in shape, freely movable, and of quite firm consistency. The uterus cannot definitely be made out.

A blood count showed white cells, 7,000; hemoglobin, 85 per cent; red cells, 4,600,000; differential count, polynuclears, 75 per cent; small lymphocytes, 17 per cent; large lymphocytes, 8 per cent. Urine was clear, acid; specific gravity 1,020; sugar, absent; albumin, faint trace. Microscopic examination shows considerable bladder epithelium and an occasional pus cell and red-blood corpuscle. Patient's

Fig. 1.—The tumor in gross. The uterus is seen as a small body lying at one side of the tumor and connected with it by the tube and broad ligament.

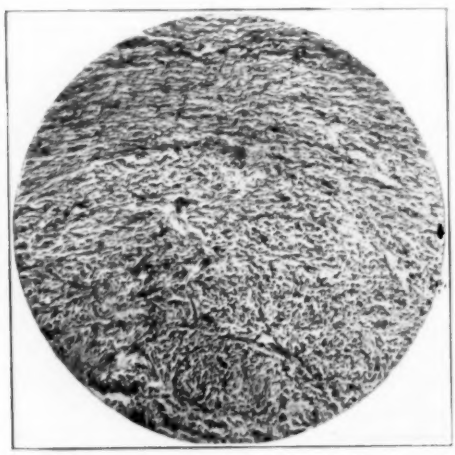

Fig. 2.—Low power; showing infiltration of lymphocytes, indicating beginning degeneration.

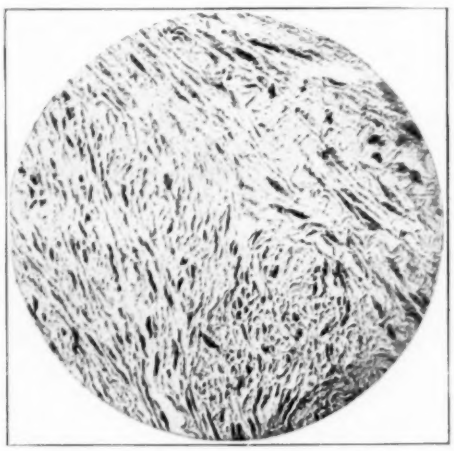

Fig. 3.—High power; showing newly formed connective tissue and occasional smooth muscle fibers.

temperature, 98.6° F.; pulse, 65; respirations, 15; systolic blood pressure, 120; diastolic, 84.

Operation February 28, 1920. Under ether anesthesia, after gas-oxygen induction, the abdomen was opened through a midline incision extending from the umbilicus to the pubes. The uterus was small and atrophic, situated a little to the right of the midline, deep in the pelvis. The pelvis was filled for the most part by a firm, smooth, spherical mass occupying the position of the left ovary. There was some free fluid in the abdominal cavity. A supravaginal hysterectomy and left salpingo-oophorectomy were done in the usual way. The appendix was removed as

an incidental measure, and the abdomen closed in layers. The patient was in good condition at the end of the operation.

Pathologic report of Dr. J. H. Warvel: The tumor in the gross was nearly spherical; of firm consistency, with well-developed fibrous capsule. A short section of the tube joined the tumor to the uterus, which was very small. The other ovary is enlarged and cystic. Microscopically, the section of ovary showed a rather loosely connected fibrous tissue. The nuclei of many of these cells being lost. There was no evidence of mitosis. Some areas showed a degeneration of the connective tissue with an infiltration of lymphocytes. All ovarian tissue was lost. The tumor is quite vascular. Diagnosis: Fibroma of the ovary. (See Figs. 1, 2 and 3).

A rather extensive investigation of the literature on the subject of ovarian fibroma reveals three outstanding papers; namely, those of Coe, 1882; Peterson, 1902; and that of Hellman, 1915. Mention might also be made of a book on ovarian tumors by Peaslee, published in 1872, in which a section is devoted to this subject. The remainder of the literature, however, consists chiefly in reports of single cases, and unfortunately, often without microscopic examination of the tumor. It has been repeatedly emphasized that the diagnosis of such a tumor as an ovarian fibroma should be made by a competent pathologist only after a painstaking microscopic examination. The literature contains several case reports in which the tumor is diagnosticated as an ovarian fibroma merely upon its gross appearance and hardness, while other reports describe tumors diagnosticated as fibroma before microscopic section, only to show some form of sarcoma, adenofibroma, etc., after section was made. Pure fibromata *per se* are considered here.

Considering the infrequency of the condition, deductions regarding the etiology, symptomatology, diagnosis, prognosis and treatment, as well as the pathology, must necessarily be made from reports in the literature in lieu of extensive personal experience. Coe has called attention to the fact that ovarian fibromata are either absolutely ignored in textbooks or else passing comment is made as to their rarity or obscurity and nothing else is said about them. This is true of many French writers as Edis, Gallez, Courty, Becquerel, and Nonat. Among the German writers, Leopold, Scanzoni, Bigel, Olshausen, Schroeder, Virchow, Rokitansky, Klebs, Rindfleisch and Klob have either reported cases or discussed the subject, especially from the pathological aspect. Among American writers, Churchill, Goodell, Sims, Emmett, Atlee, Peaslee, Thomas, Laidley, Fullerton, Peterson, and Hellman have especially called attention to the condition.

Ovarian fibromata comprise approximately two per cent of all ovarian tumors (Hellman and Reel). They occur from the time of puberty to an advanced age, the youngest reported being in a girl of seventeen years (Hellman's case), while the oldest was in a woman of seventy-three (McCann). The majority occur in single women and around the menopause. Cases have been reported complicating pregnancy (Carstens). Peterson in 1902 remarked their occurrence in whites exclusively; but Dickenson, in Goffe's paper two years later, cites a case of

ovarian fibroma removed from a negress. The size and weight of these tumors as reported in the literature vary extremely, the smaller ones being found completely enclosed within ovarian tissue, while the larger ones reach the weight of fifty-six pounds (Simpson), or even forty kilograms (Clemens). Virchow states that the size of true ovarian fibromata varies from that of a hen's egg to a child's head.

The etiology of these tumors always has been, and still is, obscure and much has been written pertaining thereto. The widely divergent views of many pathologists and surgeons are given in Hellman's paper. An origin in the corpus luteum is attributed by Scanzoni, Rokitansky, Klebs and Schauta. Hemorrhage into the ovary as an etiologic factor is given by Brothers, Kroemer, and Koeberle. Kiwisch, Virchow, Klob, Peaslee and Olshausen assert an inflammatory origin. Hellman thinks the tumor must come from connective tissue which may be found in five places in the ovary: first, the stroma of the ovary; second, the corpus luteum; third, the corpus fibrosa; fourth, in organized blood clots, and fifth, in the capsule of the ovary. He feels this sudden increase in normal connective tissue elements to be due to, first, inflammation, mechanical, as hemorrhage or hyperemia; second, bacteria, as follicle infection; third, scirrhotic, from retrogressive changes at the menopause; or fourth, possibly to some chemical action.

In the majority of the reported cases patients have complained of a swelling of the abdomen, pain of varying degree, often none at all, and not infrequently of feeling a hard mass through the abdominal walls. Other symptoms, such as frequency of urination, constipation, etc., are due to varying mechanical factors. Objectively, the tumor is usually palpated without difficulty. Its consistency, mobility, and unilateral occurrence are significant. One feature, however, is of marked diagnostic importance when present; namely, ascites. The weight attached to this finding has been especially emphasized by English writers on the subject. It may be recalled that fibroma elsewhere, and especially in the uterus, is rarely associated with ascites. The presence of ascites with intraabdominal carcinomatosis, located either primarily or secondarily in the ovary as a tumor mass, is common, but is associated with many other signs and symptoms not found in fibroma of the ovary. In other benign tumors of the ovary, ascites is usually lacking. It, therefore, seems of considerable diagnostic importance to find ascites together with a unilateral adnexal tumor in a case lacking signs of cachexia, great loss of weight, or symptoms pointing to a focus of malignancy elsewhere in the body, as in the breast or stomach. Hellman states that only 5 per cent of ovarian fibromata show ascites. When present, the collection of fluid may reach huge proportions, as in the case reported by Goodell, where repeated tappings were necessary for the relief of pressure. Olshausen believes such ascites to be due to mechanical causes (Hellman), a view shared by an anonymous writer (1903) who thought the movement of the tumor in the abdominal

cavity produced the fluid. However, secretion from the tumor (Schatzschen), hyperemia (Schauta), and a chemical origin (Pfannenstiel, quoted from Hellman) have also been advanced as causes.

In the absence of ascites, differential diagnosis from that of other adnexal tumors offers considerable difficulty. The tendency of ovarian fibromata to be unilateral, movable and hard, should be borne in mind. In the presence of ascites, where nephritis, cardiac decompensation, portal obstruction, abdominal carcinoma, tuberculous peritonitis, and the anemias can be ruled out, the occurrence of such findings should make one very suspicious of ovarian fibroma.

The treatment, without exception, is operation. The prognosis, as indicated from case reports, is excellent.

The pathology of ovarian fibroma has been carefully studied by several investigators. In fact, the literature consists chiefly of pathologic studies. Grossly, as already stated, maintains that these tumors vary tremendously in size. Their consistency, likewise, is extremely variable; some, composed of a loosely woven network of connective tissue, being soft; while others, as in the case reported by Sir Spencer Wells, require the use of a bone saw for their section. In a similar way their shape, appearance on cross section, color and general outline cover a wide range of possibilities. They show many forms of degeneration and it is on account of these as well as the possibility of a twisted pedicle, that their removal should be urged. The court of final judgment is the microscopic appearance of the tumor. Hellman insists that there must be a certain regularity of the individual fibers or muscle cells and strands, despite varying quantities of cells, fibers, vessels and degenerative changes. He found the cells in his case to be short and spindle-shaped with a slightly bent or pointed nucleus. Edema, necrosis, hyalin masses, and fatty changes are not uncommon. Several writers, especially Coe, have mentioned the occurrence of geodes, presumably dilated lymph spaces, which are seen in these tumors. Cases are reported also in which bone, cartilage and chalk have been found.

CONCLUSIONS

1. Ovarian fibromata are sufficiently rare to warrant the report of all carefully studied cases.

2. The diagnosis is dependent solely on microscopic examination.

3. In the presence of a hard, unilateral, movable tumor with ascites, where the more common causes of ascites can be ruled out, ovarian fibroma is highly probable.

4. The treatment is operative; the prognosis good.

5. The gross pathology of the condition is extremely variable; the microscopic pathology, as pointed out by Hellman, must show a certain regularity of the individual fibers or muscular cells and strands, despite varying quantities of cells, fibers, vessels and degenerative changes.

BIBLIOGRAPHY*

Astruc: Diseases of Women, London, 1743.
Bagot: New York Med. Jour., iii, p. 248.
Baldy: Am. Jour. Obst., xlvi. 850.
Becquerel: Maladies de l'Uterus, ii, p. 266.
Bissell: Am. Jour. Obst., xliii, 112. Ibid., xlviii, 362.
Boldt: Am. Jour. Obst., xlvii, 205. Ibid., xliii, 724. Med. Rec., New York, lxxxix, 666.
Bovee: Am. Jour. Obst., xlvi, 542.
Briggs: Brit. Med. Jour., lxxxvii, 1083. Lancet, London, March 9, 1902.
Brothers: Am. Jour. Obst., xli, 194. Ibid., 1, 104.
Campbell: Brit. Med. Jour., 1906, p. 695.
Carstens: Trans. Am. Assn. Obst. and Gynec., 1889, ii, 151.
Coe: Am. Jour. Obst., xv, 561-83; 858-79. Ibid., xxiii, 412.
Courty: Maladies de l'Uterus, p. 813.
Doran: Trans. Obst. Soc. of London, xxx, 410. Brit. Med. Jour., 1889, p. 1287. Trans. Obst. Soc. of London, xxxviii, 187. Ibid., xliv, p. 172.
Eden: Lancet, London, February 8, 1902, p. 349.
Edis: Diseases of Women, 1882, p. 282.
Emmett: Am. Jour. Obst., 1901, p. 237.
Fairbairn: Trans. Obst. Soc. of London, xliv, 177.
Gallez: Hist. des Kytes de l'Ovarie, p. 40.
Gemmell: Lancet, London, May 3, 1902, p. 1253.
Goodell: Am. Jour. Obst., xi, 152. Ibid., xv, 74.
Goffe: Am. Jour. Obst., l, 105.
Graham: Ann. Surg., xxxvii, 468.
Greig: Edinburgh Med. Jour., xvi, 444.
Hellman: Surg., Gynec., and Obst., xx, 692.
Henroten and Herzog: Am. Jour. Obst., xl, 789.
Hunner: Bull. Johns Hopkins Hosp., October, 1902, p. 251.
Hunter: Am. Jour. Obst., xviii, 1204.
Jones: Trans. Am. Assn., Obst. and Gynec., xxvi, 244. Am. Jour. Obst., lxviii, 906.
Klob: Pathological Anatomy of Female Sexual Organs, p. 1868.
Laidley: Am. Jour. Obst., xlii, 661.
Lamb: Washington Med. Ann., xii, 299.
Levin: Med. Jour. S. Africa, xi, 52.
Mallet: Am. Jour. Obst., liii, 100.
Manton: Trans. Am. Gynec. Soc., xxxv, 17.
Martin: Lancet, London, April 5, 1902, p. 968.
McCann: Brit. Med. Jour., 1903, p. 127.
Montgomery: Amer. Jour. Obst., xxi, 323.
Mundi: Amer. Jour. Obst., 1889, p. 282.
Nonat: Maladies de l'Uterus, p. 889.
Peaslee: Ovarian Tumors, 1872.
Peterson: Trans. Am. Gynec. Soc., xxvii, 264.
Pfannenstiel: Ref. f. d. Verhandl. d. Deutsch Gesellsch. f. Gynäk., xi.
Purslow: Lancet, London, 1887, p. 1398.
Reel: Am. Jour. Obst., lxxv, 400.
Rindfleisch: Zentralbl. f. Gynäk., 1906, No. 7.
Rokitansky: Wiener Med. Wchnschr., 1859, No. 34.
Royster: Am. Jour. Obst., xlvii, 262.
Sims: Am. Jour. Obst., xxix, 1265.
Sutton: Tumours Benign and Malignant, Chicago, 1903.
Swain: Brit. Med. Jour., December, 1904, p. 1737.
Thomas: Am. Jour. Obst., xii, 350.
Virchow: Tumours, 1867.
Waldeyer: Arch. für Gyn., ii, 3.
Warren: Boston Med. and Surg. Jour., cxxviii, 10.
Wells: Trans. London Path. Society, x, 199.
Wiener: Am. Jour. Obst., lxxii, 209.
Williams: Trans. Am. Gyn. Soc., clxxxvii, 359. Philadelphia Med. Jour., December 29, 1900.

*Our thanks are due Miss Maude Nesbit, in charge of the medical department of the Indianapolis Central Public Library, for collecting the references in the bibliography.

HUME-MANSUR BUILDING.

(*For discussion, see p. 632.*)

SOME INDICATIONS FOR HYSTERECTOMY*

By J. F. Baldwin, M.D., F.A.C.S., Columbus, Ohio

As a general rule most surgeons limit their indications for hysterectomy to fibroids producing marked symptoms, to cancers, and rarely to certain types of puerperal infections; but occasionally they extend their advice to cases in which double tubo-ovarian abscesses have been removed, and in which the uterus is found denuded of its peritoneum.

A composite picture of a certain class of patients who present themselves very frequently to the physician, would represent a woman usually between 30 and 40 years of age, but with the limit extending in either direction; she has usually had one or more children, or miscarriages, or both; there often is a laceration of the cervix; the uterine body is enlarged, hard and tender, with more or less tendency to dropping down and retroversion; there is a history of prolonged and humiliating leucorrhea, pronounced dyspareunia, backache, bearing down, marked pelvic discomfort and general unhappiness. Almost invariably she has been treated locally by pessaries, tampons, curettements, Churchill's tincture of iodin, carbolic acid, Battey's iodized phenol, or something of that sort; during treatments she has perhaps felt a little better, but improvement, if anything more than imaginary, has been very transient.

Only a few months ago a patient was referred to me who had been studied in a celebrated Baltimore clinic for over two weeks. She had come home with the advice to keep quiet for a number of weeks, and to be dieted so as to reduce her weight by 15 pounds, as she was that much heavier than the average. (Her 15 pounds overweight was a family characteristic and therefore physiologic.) On obtaining her history I found that she had been wearing a pessary for over 12 years; she was menstruating every three weeks, the flow being about twice the normal and more or less clotted; there was a profuse leucorrhea, and pronounced dyspareunia, backache and bearing down pain. On examination I found a deep bilateral laceration of the cervix, the finger readily passing to the internal os; the uterus very tender, much enlarged, hard, and a little irregular in outline. Hysterectomy was advised and performed. The operation revealed a fibroid an inch in diameter at one horn of the uterus; extensive adhesions at that point, and the uterus itself weighed four times the normal. Her recovery was abso-

*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20, 21, 22, 1920.

lutely uneventful, and now there is no more leucorrhea, no dyspareunia, and she can go out riding with her husband without the slightest discomfort, and is in every way in infinitely better health than she has been for many years.

I know of no treatment, local or constitutional, which will cure these cases of chronic uterine hyperplasia. If the condition is quite recent, hygienic treatment, hot douches, and possibly tampons may occasionally restore the parts to normal, but I am speaking here of chronic conditions.

Abdominal hysterectomy for the conditions mentioned is an operation which, when properly performed, is almost absolutely devoid of danger; while the relief afforded is prompt, complete, and permanent. Repeatedly, within a week of the operation, patients have told me that they had not felt so well for ten years, and I have no truer friends in my clientele than the many hundreds who have been subjected to this operation.

A number of years ago the late Maurice Richardson wrote an article in which he mentioned the dangers inherent to every operation, but having no direct connection with the operation itself. These dangers are present in every hysterectomy, but when the endometrium and vagina are sterilized, as in the technic which I described and clinically demonstrated at the meeting of the Association in Louisville, in 1916, the danger of peritonitis would seem to be eliminated, and that eliminates, humanly speaking, all the direct dangers of the operation. The occasional deaths which will take place from the causes mentioned by Dr. Richardson, will be vastly more than balanced by the improved health of the patients and the prolongation of life as the result of increased resistance to ordinary infections.

In saving the ovaries I feel that it is very important to save the tubes as well, unless they are badly diseased, since the nutrition of the ovary is so largely dependent upon the blood supply afforded by the tube.

At the completion of the operation the round ligaments and the stumps of the broad ligaments should be implanted in the vault of the vagina, and the ovaries attached to the round ligaments well up on each side so that they will not drop down into the culdesac where they might be a source of discomfort.

As the cervix in this class of cases is almost invariably unhealthy, and doubtless responsible for much of the leucorrhea, it should always be removed with the body of the uterus. Panhysterectomy I have been insisting upon for a number of years, partly to get rid of the unhealthy tissue and partly to obviate possible malignancy developing later.

Dr. W. J. Mayo recently (Jour. Am. Med. Assn., June 19, 1920) wrote quite at length of the importance of preserving the menstrual function. He even suggests that "menstruation itself has some important

endocrine function," and says that "the effect on the patient is essentially the same whether menstruation is stopped by removing the ovaries and leaving the uterus, or removing the uterus and leaving the ovaries."

My own experience and observation has been so entirely different from this that I was surprised at the statement. Because of my having devised, a number of years ago, a method of operating for the construction of an artificial vagina, I have been consulted by a considerable number of women who had been born without a vagina; and, incidentally, in all those cases also without a uterus, although never without ovaries. Necessarily there had never been any menstruation, and yet in all those cases, except for the deformity, the women were apparently entirely normal and womanly, and many of them decidedly attractive. Twice I was consulted by young women having normal vaginas, but no uteri. They, too, seemed perfect women. We have all seen considerable numbers of women with absolutely infantile uteri, and yet they were normal except for the amenorrhea. I have done several thousand hysterectomies and the results have been so uniform that I had regarded it as a settled fact that the mere function of menstruation was entirely unimportant, and frequently a disadvantage and annoyance; but that the preservation of the ovary and its internal secretion, particularly in young women, was of very great importance to happiness and health. Hence, I have for many years removed the uterus without the slightest hesitation, except as its removal prevented child-bearing, while I have practiced conservation of the ovaries in women under forty, particularly under thirty-five, with the utmost care.

Why it is that the human female is the only one throughout the animal creation that menstruates, no one has been able to determine satisfactorily. Several hypotheses have been advanced. The statement has been made that the female of the monkey menstruates, but that has been authoritatively denied. While the menstrual function has a known average of time and amount, some women have such a scanty flow as to be practically none at all; and yet such women seem to be as healthy and fruitful as others. And it is well known that, occasionally, a perfectly healthy woman will have her pregnancies at such intervals that she has no flow whatever during her entire child-bearing life. It would seem self-evident that if the menstrual flow itself were of any particular importance it would extend throughout the animal kingdom, at least the higher types of animals, and its occasional absence in the human individual would be attended with marked and definite symptoms of ill health.

Since the publication of Dr. Mayo's paper I have taken pains at every opportunity to talk with patients upon whom this operation had been done a number of months or years previously, and their testi-

mony has been uniformly contrary to his conclusions. My patients were all private patients, and my opportunities for ascertaining postoperative conditions have been unusually good, so that I may state without fear of contradiction that postoperative discomforts, when normal ovaries are saved and with ample blood supply, except as due to other complications, are not present.

It occasionally happens that a surgeon is consulted by a woman who has suffered from dysmenorrhea throughout her entire menstrual life; if married, there have been no pregnancies, and the menstrual pain frequently precedes the flow by several hours or days. The menstrual discomfort and consequent disability may last for two or even three weeks out of every month. Examination will not infrequently show the presence of an undeveloped uterus, which has been the source of all of this discomfort, and which has been of no possible benefit. If the patient is young it is possible that the wearing of a cervical dilator for weeks or months, as advised by our late colleague Dr. Carstens, might produce such development of the uterus as would result in functional usefulness. I have tried that treatment in a number of instances; but thus far with uniform failure. However, its cautious trial might be wise so as to give the patient every chance. If, however, she is advanced in years no one would anticipate any improvement by that treatment; and in all those cases, if the pain is such as to demand relief, removal of the uterus should be made. In the comparatively young the ovaries should be saved because of their internal secretion; but the offending organ, the undeveloped and functionally imperfect uterus, should be extirpated.

The office of the surgeon is to save the life of the patient when it is in jeopardy; but more frequently it is to restore to health and happiness a chronic invalid. This paper is a plea for the cure of a class of chronic invalids who can be cured by the treatment suggested but who, too frequently, drift from one physician to another, to be treated by inert methods long since discredited by intelligent members of the profession.

CONCLUSIONS

(1) Chronic uterine hyperplasia is incurable by local or constitutional treatment, and its presence is the source of much ill health, discomfort, and unhappiness.

(2) Uterine hypoplasia is generally, if not always, a source of sterility, marked dysmenorrhea, and much invalidism.

(3) In these two conditions hysterectomy effects a cure, "*tuto, cito et jucunde,*" and should be resorted to when the diagnosis has once been established.

115 South Grant Ave.

LUTEUM EXTRACT: A FURTHER REPORT*

By Adam P. Leighton, Jr., M.D., Portland, Me.

FIVE years ago, I presented to this Association, a consideration of the use of corpus luteum extract in the treatment of the neuroses of the artificial and physiologic menopause, in dysmenorrhea, and for the relief of those symptoms usually coincident with, or following in the wake of lessened ovarian function. At that time I reported results obtained through the administration of this product, when specifically indicated and, in addition, had the temerity to incorporate in that paper, some personal theories to explain how the remedial action was brought about.

It is not my intention to delve deeply into the subject of general organotherapy or to attempt to explain in detail, physiologically, the probable reason for the beneficial results accompanying or produced by, the ingestion of luteum extract. The subject is too involved and contains so many diversified and contradictory opinions, that I confess, indeed, my inability to apply, to any great extent, the multiplicity of theories given in explanation of the supposed synergistic action and interrelationship of the several ductless glands.

In the past six years and a half, I have had the opportunity to employ ovarian organotherapy in the treatment of over three hundred women, each one of whom presented definite symptoms of diminished ovarian secretion, combined in some instances with lessened activity of other endocrine glands. They have all been private patients and, for that reason, I have been able to keep accurate case records and to observe in the majority the effect of thorough and prolonged treatment. I admit that the number of cases is small and that little importance may be attached to a report of this kind, however, my desire is but to state the result of my observation of these cases in which the only ovarian product used was luteum extract.

The importance of the endocrine glands in the physiologic economy has, in the past few years, been especially emphasized. Consistent with the advance of scientific knowledge of the subject, the greater and more widespread use of glandular substances in therapeutics has occurred. Laboratory experimentation has greatly aided in our understanding of certain glandular function, but for the most part our knowledge of the action of the ductless glands has come through clinical evidence and observation and, in regard to the corpus luteum, almost entirely.

*Read at the Thirty-Third Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Atlantic City, N. J., September 20, 21, 22, 1920.

The endocrine system is so finely balanced that a change in the internal secretion of one organ is capable of upsetting the entire equilibrium of the system. One, therefore, must consider the normal interrelation between a disturbed endocrine gland and the rest of such glands, before attempting to explain the symptomatology produced by the cessation or improper performance of function on the part of the individual organ of internal secretion.

The question as to what tissues in the ovary are responsible for the manufacture or elaboration of the internal secretion, still remains practically unsettled. In recent years, much discussion of this subject has taken place and, while it is admitted that the corpus luteum exercises an obvious internal secretory activity, there is good evidence that the interstitial cells of the ovary, have a function of distinct similarity.

Dr. Graves, of Harvard University, in his recent article on "Ovarian Residue" has endeavored to prove that an internal secretion equal or superior in therapeutic value to that produced by the corpus luteum, is manufactured in the general ovarian tissue. This investigator, claiming to have obtained irregular and unsatisfactory results from the administration of corpus luteum extract and a product from the whole ovary, resorted to the use of "ovarian residue" or that part of the ovary which remains after extirpation of the corpora lutea and which heretofore has been discarded as valueless. Dr. Graves has made use of ovarian residue in the treatment of those patients who exhibited the signs and symptoms of ovarian deficiency for which he had previously considered the other two products indicated and, after considerable experience with this new substance, he states that it is superior in its clinical results to any other ovarian preparation; that it preserves its chemical integrity longer and that, in truth, the secretion of the atretic follicles arising from cells analogous to the cells of the corpus luteum, is similar in action and more potent. I am unable to compare the respective merits of the two preparations, inasmuch as I have never used ovarian residue. Recently, I have had the opportunity to note ready response to luteum extract in the relief of menopause symptoms, in two patients to whom ovarian residue had been given by another physician, without benefit. It is fair to state however, that I doubt if these two women had given the ovarian residue sufficient trial and that alone may explain the unsatisfactory result. It will be interesting to note the results obtained by other observers making use of this newer product, for while one does not doubt its efficacy, it is only through comparative results that we are able to arrive at the proper decision in regard to organotherapeutic treatment.

The correlation of the ductless glands, presents an intricate and interesting study. Certain truths we accept, but unfortunately most of our knowledge of endocrine function is theoretical and in endeavoring to differentiate between the physiologic phenomena supposedly

arising from this glandular activity in the normal state and the symptoms caused by abnormal functions, we meet with difficulty.

I have repeatedly observed, however, such a seemingly close association between the thyroid and the ovarian activity, that I cannot pass it by without due reference; because it has been demonstrated in my experience that, in the treatment of women presenting definite signs of ovarian deficiency, the use of thyroid extract is necessary in combination with luteum, to the end that the action of the latter is greatly enhanced, and more prompt, satisfactory, and lasting results are forthcoming.

I refer not only to those cases with undoubted thyroid insufficiency in which it is necessary to make use of thyroid extract, but in those instances where the etiologic factor of hypofunction is lacking and the condition is attributed to ovarian dysfunction entirely. Here I have given luteum extract thorough trial, without the usual benefit, and yet, where I add the thyroid extract in an empirical fashion, satisfactory results are often obtained.

While the correlationship of the adrenal, thyroid, pituitary and ovary is theoretically well known, it seems to me that the relative activity of the thyroid and that of the ovary is more suggestive, and probable.

It seems rational to believe that the thyroid exercises a particular governing effect upon the whole endocrine system, in truth, possibly presiding over and maintaining the synergistic action of the whole. No definite explanation has ever been offered for the hypertrophy and hyperplasia of the thyroid occurring during the menstrual period, pregnancy and in the early stages of ovarian deficiency, and yet it is obvious to all of us that an increase of thyroideal activity, to a greater or less degree, is evident at that time. It is a normal physiologic function, generally, but becomes decidedly abnormal when associated with primary hypofunction of the ovary or of any other gland of internal secretion.

May I be allowed to venture the proposition that, in cases of lessened ovarian function, this increased activity of the thyroid, manifesting symptoms of hyperthyroidism, many times is but a compensatory action of this organ, to supply the extra stimulus to the ovary, necessary for the maintenance of the phenomena presided over by the latter.

How often do we see this picture of slight ovarian insufficiency, coupled with thyroideal hyperfunction, and all the symptoms of the latter, followed soon after by the signs of thyroideal hypofunction; or, as I would call it, thyroideal decompensation. That this same picture may be noted when lessened activity of another gland occurs, and not the ovary, is likewise assumed, hence the idiopathic hyperthyroidism.

I have made use of thyroid in conjunction with luteum extract in the relief of some cases of menorrhagia, where uterine, adnexal, and

other pelvic disease, or tumor, might be ruled out. It has been as a matter of experiment, I will admit, but more often than not, exceptional benefit has followed.

The use of luteum extract uncombined in cases of premenopause menorrhagia, has brought about a marked diminution in flow and in the menorrhagia coexistent with ovarian cystic degeneration, mitigation of the hemorrhagic tendency is usual.

In my previous paper, mention of the fact was made that dysmenorrhea of a certain type was especially amenable to treatment through ovarian organotherapy. Others have reported excellent results. There is no doubt but that aside from the causes enumerated in text-books, ovarian dysfunction is a distinct etiologic factor. We do obtain results and therefore in explanation might we not assume that the ovarian hormone has a peculiar selective action in the uterus, in perhaps stimulating some endometrial autolytic enzyme, which so softens and digests the histologic elements of this tissue so that the normal physiologic phenomena (diapedesis, rupture of the hematomata, and exfoliation of the mucous membrane) are made possible and easy, thereby constituting normal menstruation. Where this ovarian hormone is altered or lessened, it may fail to stimulate in sufficient amount, this autolytic enzyme, with the result that the endometrium, lacking in its proper preparation and softening acts as a barrier to an easy escape of blood; the congested membrane either remains to form a foreign body and sets up uterine spasm or becomes detached in the comparatively large portions which are characteristic of so-called membranous dysmenorrhea. This is but a repetition of my former suggestion and, when I consider that the most favorable results were noticed in the administration of luteum extract, in those cases presenting the excessive first day pain, with scanty discharge simulating an intense unrelieved congestion, it is not altogether illogical.

Dysmenorrhea demands continuous use of luteum extract for a period of ten to twelve weeks, before one may expect to obtain relief, if such is to follow. To give luteum, or any ovarian product to a woman, with the directions to take it for the week or ten days previous to each menstruation, and to expect results, is a waste of time and money; and yet, I have often seen prescriptions calling for this inefficient therapy.

Hyperthyroidism and even early exophthalmic goiter has been distinctly aided by luteum. The extreme cardiovascular and general nervous manifestations have been lessened. Hoppe, of Cincinnati, has recently reported excellent results and bases his treatment on the theory that hyperthyroidism is caused by defective secretion of the interstitial sex glands and that the hormones of these have an inhibitory and regulating action on the secretion of the thyroid. When their function is deficient there is this lack of thyroideal inhibition with

the resulting excessive secretion of this organ or hyperthyroidism. Given primary ovarian insufficiency, or of any other ductless gland, I believe that this hyperthyroidism is the result of continuous and prolonged compensatory effort upon the part of the thyroid to make up the deficiency in action of that gland which first became underactive.

In the menopause in contradiction to the reports of others, relief of the distressing symptoms is especially possible. Luteum extract supplies that element so necessary to the woman during her normal menstrual life. This therapy exerts its greatest benefit in the treatment of those women who have begun to exhibit the early manifestations of the climacteric. To avoid the unsatisfactory results which have been reported by some gynecologists, it is necessary that luteum extract should be administered early and continuously once the diagnosis is made. Procrastination on the part of the patient or the physician often means ill success. When menstrual irregularity makes itself known and the hot flushes, mental confusion, tremor and hyperthyroideal symptoms are first evident, then is the proper time for ovarian organotherapy, not waiting until the height of the disorder has been reached or the woman has suffered for months or years with a "chronic" menopause. Early control is necessary and, once obtained, it is easy of maintenance. The action of luteum extract is slower, I have observed, and it takes longer to gain the effect of this product in the climacteric, than in any other condition depending on or due to ovarian deficiency.

In over half of those 300 or more women mentioned previously, to whom luteum extract was given, the indication for its use was solely the menopause symptoms. Of this entire number, there were not over a dozen who could not report exceptional benefit, even to absolute relief. The results gained seemed wholly in relation to the duration of the menopause and the length of time in which luteum was administered. Early menopause symptoms responded almost generally and completely. The longer the use of luteum extract had been put off, the poorer the results and the harder to gain control. Most of these women continued, or are continuing the treatment over a period of anywhere from three or four months to two years or more, obtaining relief all this time, or ultimately leaving off, when they have seemingly been helped through this trying epoch of their life.

The masterly paper of Dr. Sanes, of our own Association, on "The Hot Flushes of the Menopause," contains much of value and interest in the discussion of the etiology of this symptom.

Far be it from me to endeavor to utilize any part of his scientific presentation of the subject, but while you may accept the probable explanation, through the hyperactivity of the adrenal medulla, sympathetic system, thyroid, and posterior hypophysis, and conclude that the organotherapy of the menopause calls for the follicular structure

of the ovary, extract of adrenal cortex, and extract of the anterior pituitary, with the corpus luteum theoretically excluded, I can conscientiously and truly report the preceding satisfactory results with corpus luteum extract used alone. The prolonged and thorough use of luteum in the early physiologic and artificial menopause does relieve, and I am hoping today to hear others make a similar statement, to prove the truth of this remark.

To those women who during the menstrual life complain of so-called "sick headaches" of the frontal and temporal type, with nausea and vomiting, which occur with peculiar periodicity, at or about the time of menstruation, ovarian organotherapy offers much relief. At least that has been my experience.

In chlorosis, as an adjunct to hematinics, luteum is also indicated. I make it a point to prescribe it in each case, and in those instances where the moderate hyperthyroidism is present the action is especially beneficial.

The functional amenorrhea of women, in early adolescence or mid-menstrual life, responds in a miraculous manner as you all know. If obesity is a coexistent condition, thyroid is of inestimable value. No doubt pituitary dysfunction is to be considered in many of these patients; but, as yet, I have not made use of any pituitary product, relying wholly upon luteum or a combination of luteum and thyroid.

In obese patients where this deposition of fat is attributable to thyroid insufficiency, thyroid has long been used to remedy the abnormality. How often do we find that there are and have been symptoms of certain ovarian hypofunction also, and in fact, we are able to trace the origin of this type of obesity to primary ovarian lessened secretion, followed by thyroid decompensation, after the latter's attempt, for a while, to maintain a normal endocrine function.

In the use of thyroid as a "reduction cure" the giving of luteum at the same time seems to obviate the occurrence of profuse sweating spells, muscular weakness, tachycardia, nausea, and other vasomotor symptoms, occasionally following the ingestion of thyroid extract. Larger doses of thyroid are tolerated, if given in combination with luteum.

From these brief remarks, one might gather that I had found ovarian organotherapy one hundred per cent successful. Such is not the case; and, most assuredly shall I state, that in many cases where luteum was seemingly indicated, the results have been *nil*.

However, in those conditions where the administration of an ovarian product is called for, it has been my fortunate experience to observe a relief and cessation of many disorders, referable to deficient ovarian secretion, where proper diagnosis is followed by the continuous, thorough and regular use of luteum extract. It is important above all, that one should prescribe and the patient obtain a product from

recent fresh material and care must be taken to see to it that the dispensing chemists have such on hand. The indiscriminate buying of luteum extract is one thing which I am careful to prevent. A patient is directed to the shop where I know fresh tablets are to be had. Each prescription calling for such, bears on the directions label, "These must be taken for ten or twelve weeks" and special emphasis is laid upon this point. I explain every time, at the commencement of treatment, that it is cumulative in action, that it is nontoxic, when fresh, and that one must be conscientious in its taking, as results are obtained slowly and relief is not immediate.

192 State Street.

(*For discussion, see p.* 633.)

CHORIOEPITHELIOMA FOLLOWING HYDATID MOLE, WITH REPORT OF A CASE

By Byron H. Goff, M.D., New York, N. Y.

STATISTICS on the incidence of hydatid mole by recognized authorities vary widely but all point to the rarity of the disease. Thus, Madame Bovin, in 1827 claimed an incidence of one case of mole in 20,000 pregnancies. Williamson in 1900 stated that it occurred once in 2,400 cases, while Pozzi claimed never to have seen an hydatid mole in more than 6,000 obstetrical patients which passed under his observation. More recent statistics, however, show a somewhat higher proportion than the above. Mayer, in 1911, reported in 3,105 pregnancies, one in 310 cases, and Essen-Moller, in 1912, while reviewing the histories of 6,000 patients treated in the Frauenklinik at Lund found that hydatid degeneration had occurred once in every 333 cases. Arthur W. Meyer in 1918 in a report upon his deductions from a study of over 150 new cases of hydatid mole states that the highest incidence ever reported was that of Storch who in 1878 estimated it at 50 per cent but did not publish records of his cases. It is to be noted, however, that Storch laid emphasis upon the frequent occurrence of hydatid degeneration in the early weeks of pregnancy, and pointed out the fact that the large typical mole which attracts the attention of the obstetrician is a relatively rare form of the disease.

Meyer calls special attention to the importance of the work of August Gierse, which was published posthumously by Meckel in 1847, and comments upon the failure of those who have subsequently written upon the subject to have recognized the remarkable character of his observations. Gierse first undertook to familiarize himself with the appearance of the normal chorionic villus; he believed that villi in abortions were seldom normal, and claimed that definite transitional forms could be traced between the slightest change in the calibre of villi and the most marked hydatid change. He described a villus showing hydatid de-

generation from a chorionic vesicle about 12 mm. in size with the largest hydatid one third of a line large. He stated also that such pathologic changes are present in many abortions and seem to be the most frequent cause of abortion in the early weeks of pregnancy. Though Gierse's work has not received general recognition, his findings have been completely confirmed by Meyer's work in the Department of Embryology, Carnegie Institution of Washington. Meyer states that the records of the Mall Collection show eight cases of hydatid mole in 2089 uterine specimens, a proportion of one in 261 cases. Though these figures are eight times higher than those of Williamson and slightly higher than those of Essen-Moller they are not necessarily contradictory since they represent the incidence of hydatid mole in specimens largely under seven months and not over the entire period of pregnancy. Moreover, they do not represent the actual occurrence even in the early months of pregnancy since they are based on gross examinations and not upon a microscopic study.

A careful gross and microscopic study by Meyer of material from over 400 abortions showed an actual incidence not eight times but 240 times greater than that of Williamson and 33.3 times greater than that of Essen-Moller. It is to be especially remembered, however, that these figures are based upon the findings in abortions in the early weeks of pregnancy and by no means represent the occurrences in the later months.

Meyer's interesting findings justify his conclusion that hydatid degeneration is a common disease in the early weeks of pregnancy becoming less frequent as term is approached. He states that he does not know the exact incidence in the later weeks but that the condition is, no doubt, a relatively rare one as former statistics would indicate.

Basing his statement upon previous statistics, Findley says that 16 per cent of hydatid moles are followed by chorioepithelioma. Teacher, on the other hand, believes that less than 5 per cent develop malignancy. In the light of the more recent findings of Meyer it is a difficult matter to say exactly what percentage of all moles eventually develop chorioepithelioma; obviously it must be lower than generally given. In regard to this phase of the subject Meyer emphasizes the fact that the type of mole which he studied,—the early one,—shows a decided tendency to abort early and completely and to produce no further trouble in the vast majority of cases while the type which shows more prolonged and vigorous growth is more likely to be followed by malignancy.

Neuman in 1897 claimed that he could differentiate between two types of hydatid mole one of which was and the other was not followed by chorioepithelioma. Findley and others believe that moles occur in one of two forms, malignant or benign and that the differences are biologic rather than structural. The accepted view at the present time is

that it is impossible to predict the outcome of a case from the histologic picture.

Clinically two types of chorioepithelioma are recognized, malignant and semibenign. Robert Meyer and Velits have claimed that there are histologic differences between them. Ewing also is of the same opinion and states that there are certain general relations between histologic structure and clinical course. This opinion is not, however, that of the majority of pathologists.

The exact number of cases of chorioepithelioma reported to date is difficult to state because of the scarcity of literature, especially from abroad, during the past three years. Vineberg in a careful review of the literature has collected 533 cases reported before the end of 1917.

Chorioepitheliomata of the testicle and ovary are in reality teratomata developing in the chorionic stage and have the same genesis as other teratomata. All others are essentially based upon a preceding pregnancy; they follow hydatid mole, abortion, pregnancy at term, and ectopic gestation. Teacher's statistics upon 188 cases show that 39 per cent followed mole, 31 per cent followed abortion, 26 per cent labor at term and 4 per cent ectopic pregnancy. Other reliable statistics show similar proportion.

The disease occurs in women between the ages of seventeen and fifty-five years. Teacher gives the average age in 188 cases as thirty-three years; 67 per cent occurred between the twentieth and fortieth years. There were 6 cases below the twentieth year and 9 over the fiftieth year. The incidence in multiparous women is higher than in primiparæ.

The usual site of the tumor is the corpus uteri; an occasional case has been reported in an atypical site.

The period of time which elapses between the pregnancy and the appearance of a chorioepithelioma varies from a few weeks to several years. Vineberg calls attention to the fact that a chorioepithelioma may develop before the expulsion or removal of a mole and mentions a personally observed case in which this occurred.

Among the symptoms referable to chorioepithelioma, uterine hemorrhage, slight, moderate or profuse, is the most common. It is well to remember that the hemorrhage may rarely be intraabdominal, if the tumor has penetrated the uterine wall, and may produce symptoms which simulate those of ruptured ectopic gestation. Amenorrhea has been reported in connection with the disease in a few cases. Pelvic pain is usually present, colicky while clots are being thrown off, and dull in character if due to pelvic metastases. The uterus is usually enlarged, though not invariably so. The size seldom exceeds that of a 12 weeks' pregnancy.

In connection with the symptomatology it is important to bear in mind the fact that in some cases the first symptoms of the disease are caused by the metastatic lesions rather than the uterine tumor itself.

This has been reported in cases which developed cerebral, spinal and pulmonary metastases. The cystic, deep blue colored, vulvar and vaginal metastatic tumors must be kept in mind when considering the symptoms. Metastases may occur in the lungs, vulva, vagina, uterine appendages and ligaments, liver, kidneys and urinary passages, and in the central nervous system.

An interesting concomitant condition is the cystic change in the ovaries in a goodly percentage of cases of chorioepithelioma, which has been placed as high as 91 per cent when the ovaries have been examined microscopically.

The diagnosis of chorioepithelioma is at times extremely difficult. If irregular uterine bleeding occurs after the thorough removal of an hydatid mole malignancy is immediately suggested. If, however, the disease develops after abortion or pregnancy at term obvious difficulties surround a diagnosis. Recourse to the curette and microscope will usually be necessary to clear up such situations.

The prognosis is difficult to make with any degree of certainty because of the irregular clinical course of the disease. Spontaneous recoveries in apparently hopeless cases have been reported both with and without operation. Schlangenhoffer has reported such recoveries following spontaneous expulsion of the tumor from the uterus, after removal by the curette and by spontaneous regression after a partial removal in cases which showed histologic pictures identical to those in the most malignant form of tumor. Fleishman has collected seven cases in which recovery occurred following probable pulmonary metastases with hemoptysis while Schmauch has called attention to a larger group of 13 cases in which recovery resulted after vulvar and vaginal metastases. It is to be remembered, however, that recovery in cases in which there are pulmonary metastases with cough and hemoptysis is the rare exception and not the rule. The prognosis where there have been vulvar or vaginal metastases is somewhat more hopeful. Teacher's article contains interesting statistics on the mortality in chorioepithelioma in connection with the form of pregnancy which preceded.

PRECEDING CONDITION	TOTAL	DEATHS	RECOVERIES	% RECOVERIES
Hydatid Mole	73	39	34	46.6
Abortion	59	38	20	33.9
Labor at Term	49	39	10	20.4
Tubal or Ovarian Pregnancy	7	5	1	—
Total	188	121	65	34.2

In his series of 188 cases radical operation was performed 99 times with 63.6 per cent recoveries. In the cases operated upon recurrence occurred within six months or not at all with the exception of five cases.

Teacher states, however, that no case should be considered cured until at least two years have passed.

The treatment of chorioepithelioma of the uterus, once such a diagnosis has been made, is complete abdominal hysterectomy, with excision of any vulvar or vaginal metastatic tumors. Radium has given temporary relief in a few inoperable cases.

The treatment of hydatid mole and the course to follow after its removal is, on the other hand, open to argument. The usual procedure consists of a removal of the mole through the cervix either by hand or curette, and vigilance for any future irregular uterine bleeding which, if it occurs, is to be followed by a curettage for diagnosis. If the microscopic examination reveals suspicious tissue, a complete removal of uterus and appendages is done. Vineberg takes exception to this procedure and suggests vaginal hysterotomy for the thorough removal of the mole. If any irregular bleeding occurs subsequently, panhysterectomy is done without a secondary curettage for diagnosis. He claims that the chances for metastases are lessened by this method of treatment. Some have even suggested the complete removal of uterus and appendages in every case in which a hydatid mole has occurred.

The record of the case personally observed, is as follows:

Mrs. K., History No. 23087. Admitted to Woman's Hospital, July 17, 1919. White, aged twenty-three, married. Came to hospital for the relief of slight continuous uterine bleeding since June 12, 1919, and a continuous dull pain in right lower quadrant of the abdomen.

Family History.—Unimportant. The patient had always been in excellent health until June 12, 1919, when the present condition was first noticed.

Menstrual History.—Onset at thirteen years. Periods have always been regular and of a 30-day type. The duration of the flow has been from 5 to 6 days. Amount moderate with severe pain during the first two days of each period. There has never been any irregularity, except the amenorrheas incident to her former pregnancies, until the present metrorrhagia appeared.

Marital History.—The patient was married five years ago and became pregnant one year later but aborted spontaneously and completely at the third month. Full term children were born three years and one year ago. The pregnancies, labors, and puerperia were, according to the patient's statement, normal. Following the last pregnancy there was a period of three months during which the patient did not menstruate but from November, 1918, to April 23, 1919, when the last regular period occurred, the periods were normal.

Present Illness.—From April 28, 1919, until June 12, 1919, forty-five days, there was an amenorrhea which led the patient to believe that she was pregnant. On June 12 slight continuous uterine bleeding began and continued until admission to the hospital on July 17, 1919; the bleeding, therefore, had extended over a period of 36 days before admission. For the past three weeks there has been dull moderately severe pain in the right lower quadrant of the abdomen. There were no other symptoms.

Physical Examination.—Physical examination reveals a well-nourished woman of about five feet, four inches in height, 175 pounds in weight. Blood pressure: systolic, 128; diastolic, 80. Blood picture and urine normal. Wassermann reaction negative. The head, neck, thorax and extremities show no abnormality. Abdominal examina-

tion is negative except for the presence of a symmetrical uterine tumor the size of a five months' pregnancy. The examination of the genital tract shows a symmetrically enlarged uterus the size of a five months' pregnancy which has a boggy consistency. The adnexa are normal to palpation. The cervix shows moderately deep bilateral laceration, endocervicitis and erosion and is patulous. The pelvic floor is lacerated. The vaginal walls are relaxed and the vulva gapes slightly.

Diagnosis.—Upon the history of amenorrhea, the unusual consistency and the size of the uterus which was out of all proportion to the period of amenorrhea, an hydatid mole was considered.

Operation.—July 19, 1919, dilatation and curettage were performed under gas-

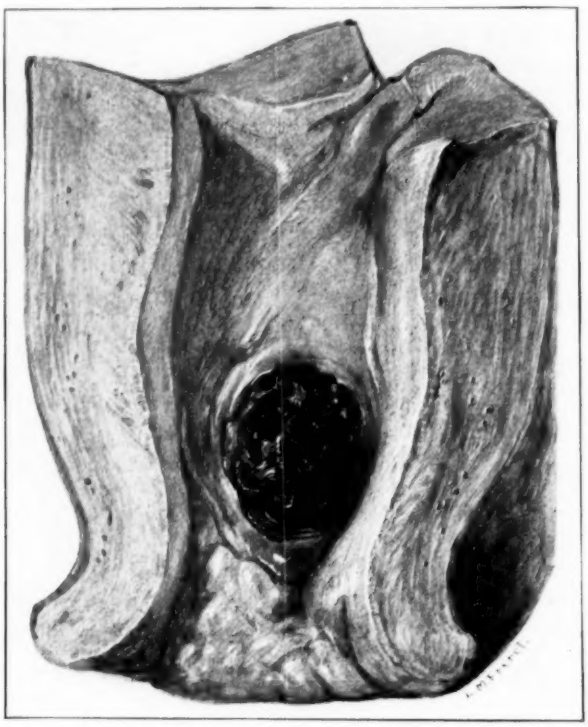

Fig. 1.—Gross appearance of the tumor upon opening the uterus; showing sharply localized hemorrhagic and necrotic area.

oxygen anesthesia. An hydatid mole was removed and the uterine cavity packed with iodoform gauze to control moderate hemorrhage.

Pathologic Examination.—Macroscopic: An hydatid mole which when spread out covered an area about the size of a full term placenta. There are several small blood clots mixed with the vesicular portions. The villi consist largely of hydropic vesicles from 0.5 to 1.5 cm. in diameter, rather globular in outline. Between are villi of delicate and normal structure attached to fibrous strands constituting the framework of the placenta. Microscopic: Several sections show a large number of hydropic villi with a double epithelial layer on the surface. There is a large amount of free trophoblast but very little syncytium present. Nothing in the sections would indicate malignancy.

Pathologic Diagnosis.—Hydatid mole of the placenta.

The patient was discharged from the hospital on the fourteenth day free from

hemorrhage and pain, with the cervix closed and the uterus partially involuted. She was warned to return for follow-up observation but could not be induced to do so. On December 15, 1919, four months after discharge from the hospital, she returned to the Out-Patient Department of her own accord and stated that she had been bleeding slightly and continuously from the middle until the end of August; in September, toward the end of the month, there had been four days of slight bleeding; no bleeding of any sort in October but on November 23, 1919, slight continuous bleeding had appeared again and had continued until admission to the hospital on December 15, 1919.

A careful general physical examination showed conditions identical to those that existed when admitted previously. The pelvic examination revealed a symmetrical uterus approximately twice the size of the normal one, and softer than normal, in a partially retroverted position and freely movable. The cervix was slightly patulous and from its canal flowed a slightly bloody discharge. The appendages were normal to palpation. The pelvic cavity contained nothing abnormal. The vulva and vagina were as previously described. The blood and urine were normal.

Diagnosis.—A tentative diagnosis of chorioepithelioma was made and a diagnostic curettage decided upon.

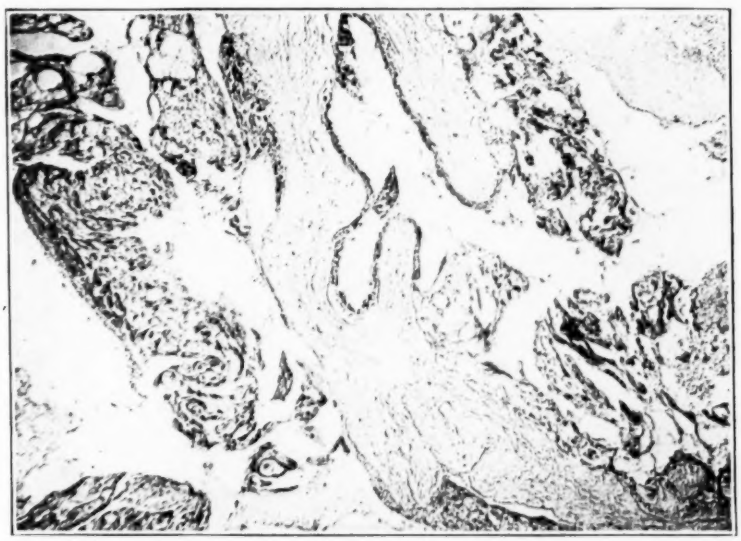

Fig. 2.—Section of curettings removed for diagnosis. Broad septa of connective tissue covered by chorioectodermal tissue. In places this is low with few layers of cells, but suddenly it forms large masses of trophoblasts with rapidly multiplying cells.

Operation.—On December 18, 1919, dilatation and curettage were performed. Upon placing a sound in the uterus its depth was found to be four inches. Upon the posterior wall of the uterine body the curette struck an elevation from which a specimen for microscopic examination was easily obtained. The curettage had to be quickly finished because of the profuse hemorrhage which was controlled by iodoform gauze packing. The microscopic examination showed fibrin and blood clots containing a number of distorted uterine glands of indefinite character, with masses of necrotic tissue containing large cells (syncytial wandering cells). A semicerotic membrane carries papillary cell masses composed of solid buds of trophoblast with syncytial giant cells. Certain wide sinuses filled with blood contain small, densely packed cells of chorionic character. (Fig. 2.)

Pathologic Diagnosis.—Chorioepithelioma of the uterus.

Operation.—On December 31, 1919, an abdominal complete hystero-bilateral salpingo-oophorectomy was performed. The uterus with both adnexa, measured 9x6x4 cm. Cervix, lacerated. Uterine mucosa, thickened, velvety and pale. At the level of the internal orifice, on the posterior wall is a fungoid growth of about 2 cm. in diameter, sharply defined towards the normal mucosa. (Fig. 1.) This node is grayish brown, very soft and penetrates deep into the musculature. The tubes are thin and straight. Both ovaries are slightly enlarged and they both contain hemorrhagic cysts of 1 cm. diameter each. One ovary contains a corpus luteum in the state of development and hyperemia. The other ovary contains several atresic follicles. The cortex contains Graafian follicles. The mucosa of the fundus shows an early premenstrual type. Various sections taken through the tumor with the adjoining musculature show a large clot of blood and necrotic tissue which has been walled off towards the inflamed muscularis of the uterus. The necrotic areas contain numbers of cells of a large type very indistinctly stained. (Syncytial wandering cells.) No sections show any trophoblast similar to that found in the diagnostic curettings and no part of the gross tumor taken shows living tissue. All appearances are those of spontaneous regression.

Pathologic Diagnosis.—Chorioepithelioma of the uterus. The patient had an uneventful recovery and was discharged from the hospital on the thirty-fourth day in good condition.

Follow-Up Findings.—Since discharge from the hospital the patient has visited the follow-up clinic once each month and to date has shown no signs of metastases.

REFERENCES

[1]Bovin: Monograph, Paris, 1827.
[2]Essen-Moller: Monograph, Wiesbaden, 1912.
[3]Ewing: Surg., Gynec. and Obst., 1910, x, 367.
[4]Findley, P.: Am. Jour. Obst., 1917, lxxv, 968. Am. Jour. Med. Sc., 1903, cxxv, 486; Jour. Am. Med. Assn., 1904, xliii, 1351.
[5]Fleischman: Monatschr. f. Geburtsh. u. Gynäk., 1903, xvii, 415.
[6]Gierse: Verhandl. d. Gesellsch. f. Geburtsh., 1847, ii,
[7]Marchand: Ztschr. f. Geburtsh. u. Gynäk., 1895, xxxii, 405; ibid., 1898, xxxix, 206; ibid., 1898, xxxix, 173.
[8]Mayer, K.: Med. Klin., 1911, vii.
[9]Meyer, A. W.: Am. Jour. Obst., 1918, lxxviii, No. 5.
[10]Meyer, R.: Ztsch. f. Geburtsh. u. Gynäk., 1906, lxviii, p. 98. Berl. klin. Wchnschr., 1909, p. 1162.
[11]Neumann: Monatschr. f. Geburtsh. u. Gynäk., 1891, p. 157.
[12]Pozzi: Rassegna d' obst. e ginec., 1908, xvii; Ginecol. mod., 1909, ii, No. 2.
[13]Schlangenhaufer: Wien. klin. Wchnschr., 1899, p. 486.
[14]Schmauch: Surg., Gynec. and Obst., 1907, xv, 259.
[15]Storch, E. D.: Arch. f. Path. Anat., lxxii, 1878.
[16]Teacher: Jour. Obst. and Gynec., Brit. Emp., 1903, iv, 145.
[17]Velitz: Ztschr. f. Geburtsh. u. Gynäk., 1904, lii, 301; ibid., 1905, lvi, 378.
[18]Vineberg, H. N.: Tr. Am. Gynec. Soc., 1918, p. 379.
[19]Williamson: Tr. Obst. Soc., London, 1900, xii, 303.

116 East Sixty-third Street.

Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS. THIRTY-THIRD ANNUAL MEETING, ATLANTIC CITY, SEPTEMBER 20-22, 1920

(Continued from the February issue.)

DR. JOHN OSBORN POLAK, of Brooklyn, N. Y., read a paper on **The Common Pathologic Lesions which are Classed as Puerperal Infections.** (For original article see page 547.)

DISCUSSION

DR. K. ISADORE SANES, PITTSBURGH, PENNSYLVANIA.—Puerperal infection of pyogenic bacterial origin begins chiefly as a lymphangitis or thrombophlebitis. When we have an invasion of bacteria in tissues there appears a small-cell infiltration; a protective wall thus forms around the invaded bacteria. The less we disturb this area, the more complete the isolation of the bacteria and the better are the chances for their destruction. If we have a thrombophlebitis, the less we disturb the tissues surrounding the vessels, the greater there is the possibility for the thrombus to organize or absorb, and the less are the chances of formation of an embolus or invasion of bacteria into the general circulation.

The first consideration in the care of puerperal infection consists of putting at rest the parts involved. The patient must not be disturbed by the surgeon or the nurse. Intrauterine treatments of any kind seem to us unsafe. Such treatment as described by the essayist is bound to disturb the uterus, the protective infiltration around it, or the thrombotic blood vessels directly or indirectly connected with it.

For a number of years we have been enforcing absolute rest in treating this class of patients, prohibiting examinations, keeping them as quiet as possible and explaining to them the dangers of violent movements, treatments and examinations.

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—So far as I know, it is almost the prevailing technic to deliver the placenta immediately. After its delivery, the uterus is pushed down by the hand over the abdomen, causing the descent. If the retraction and contraction of the uterus is desirable, this common practice is, and must be wrong, and militates against the condition that Dr. Polak has so ably called our attention to as necessary.

DR. E. GUSTAV ZINKE, CINCINNATI, OHIO.—If there is any one subject that is not perfectly understood, even by the majority of obstetricians, it is that of puerperal fever. Puerperal fever is always an infection, but the infection is not always the same, and much depends upon when and where the infection takes place after labor.

Dr. Polak said that sapremia has been virtually disregarded. I do not believe that statement is quite true, and, if it is true, I do not think it is wise. It is

of the greatest importance to know whether you have a sapremic infection or a septic infection. The difference between the two lies in the fact that a sapremic infection is due to the germs of decomposition. The germs of decomposition live upon dead matter only, and they thrive only on dead organic matter, while the septic germs, the streptococci, attack living tissue at once. They penetrate immediately the wounds within the parturient tract and enter the system either directly or by way of the blood vessels or the lymph channels.

Here is a point of differential diagnosis between the two; in order to make it emphatic and impressive, I shall take the extremes between the two infections. A sapremic infection may exist when the physician and the patient do not even suspect it, or when the patient manifests no very striking symptom. The pulse remains good for several days; the temperature hardly rises in the beginning. Gradually the pulse begins to be more frequent; the temperature rises and fluctuates between 100°F. in the morning and 101°F. in the afternoon. If there is no relief, both temperature and pulse go up, and at the end of a week or more you may have a profound putrescent endometritis, though still sapremic in character,—a condition which promptly yields to treatment if the uterine cavity is gently flushed, as Dr. Polak so graphically described. A sapremic infection is borne comparatively well even by patients whose condition has been weakened by other factors. A streptococcus infection, however, is an entirely different affair, and no matter whether the patient is weak or strong, the outcome will depend upon the activity of the septic germs and the time of entrance into the uterus, especially the placental area. The patient may have presented the appearance of a perfectly satisfactory condition in the morning; in the afternoon or evening you find the picture of apparently perfect health entirely changed. She looks as though she had been stabbed in a vital place. Her face is pale and pinched; she is frightened and seriously apprehensive; she knows she is very ill. She has had a chill lasting probably half an hour or an hour, with a consequent rise in temperature to 105-106°F., or even higher. That is the difference between the two principal varieties of puerperal infection.

A sapremic infection, when recognized early, yields to treatment very promptly; a septic infection does not respond readily to treatment. Even intrauterine irrigations amount to naught, because the germs have penetrated the necrotic tissues and attacked the living structures beneath them. They have entered the system; and, in some instances, produce a phlegmasia alba dolens, in others, a para- and perimetritis, with or without abscess formation, and in still others bacteriemia. Many times there occurs a mixed infection; but in all cases the streptococci predominate.

When particles of placental tissue or membrane are known to be present, they ought to be removed. How are we to remove them? We must not forget one thing,—that Nature in all these cases establishes her own method of defense. We have within the uterine cavity the dead superficial part of the endometrium beneath which lies its deep and healthy structure; between the two, Nature erects the wall of leucocytes which opposes the entrance of all kinds of germs. If sufficient time has passed to give Nature a good opportunity to finish the wall of protection, even the streptococcus will have a hard time to penetrate this bulwark. If a curettement is contemplated, whether you intend to use the finger or the curette, great care must be taken not to disturb Nature's own defense, the wall of granulations. Much, therefore, will depend upon the time when infection takes place. If it occurs early, the case is much more grave than if it takes place after four or five days, when the uterus is well contracted and the wall of granulations more or less complete.

DR. POLAK (closing the discussion).—In regard to the point brought out by Dr. Davis, I think all of us have adopted in the last few years the method of allowing placental delivery to take place by itself without the expression of the placenta.

Sometime ago I presented a paper, as some of you may remember, on spontaneous delivery of the placenta in 2000 cases, and in those cases we found that the placenta came away of itself without any expression if it was allowed to separate under the stimulus of the uterine contractions.

In regard to Dr. Zinke's point of the difference between sapremia and streptococcus infection, I did not make it very clear because I feel that sapremia is only an exaggeration of the normal exfoliation of the endometrium, and that the dead material is infected by the bacteria which have come up from the vagina. But since we have been making anaerobic cultures we have found a large number of these uteri that had been potentially sterile were of the saprophytic type, and contained the obligate anaerobic streptococcus which, under proper environment, may become an active streptococcus. In our own cultures made from the interior of the uterus, at forty-eight hours, five days, and seven days after labor, we found that about 50 per cent of the uteri cultured contained streptococci after the first seventy-two to ninety-six hours; yet at the end of a week these same uteri were practically sterile of this coccus, particularly if they ran an aseptic temperature, showing that the uterus in its development of the granulation zone will develop an antibactericidal action; consequently we feel, if it is capable of doing that by the formation of this leukocytic wall, all it needs is drainage. Stimulation of the proper contraction and retraction produces a Bier congestion of the uterus. Sampson's descriptions and pictures show how dangerous it is to attempt cleansing the relaxed uterus of its contents.

DR. IRVING POTTER, of Buffalo, N. Y., presented a report on the **Results of His Method of Version.** (For original article see page 560.)

DISCUSSION

DR. ROSS McPHERSON, NEW YORK CITY.—Everybody that goes to Buffalo and sees Dr. Potter's work comes back convinced that there is a good deal in his method. I know of at least half a dozen surgeons who in the last year or two have visited Buffalo, have seen Dr. Potter operate and have all become convinced that he has accomplished a great deal with his work.

In view of the number of cases which Dr. Potter has reported, this Association should begin to manifest something else besides a critical and destructive attitude towards his work. When you eliminate the cases which have died from other causes than the delivery, his stillbirth figures compare very favorably with those published elsewhere.

I have tried two or three versions on the plan Dr. Potter has outlined and I confess that the shoulder delivery has appealed to me tremendously as I have always delivered the other way.

I have been skeptical as to the results in regard to perineal laceration but in a case I had day before yesterday, a primipara, the baby weighed nine pounds and there was insignificant laceration. I have never before succeeded in doing version without making a regular laceration which required considerable repair and I have been amazed at the satisfactory results where the vagina is thoroughly dilated and delivery is done slowly.

I wish Dr. Potter would tell us more about the delivery of the aftercoming head, for this is a very important point and I hope that he will show us how he proceeds with the aftercoming head as soon as the arms and shoulders are delivered.

I do not believe however that we can trust every general practitioner doing obstetrics to perform this operation, because the minute this practitioner gets to manipulating the interior of the uterus and doing internal podalic versions, he will not only rupture the uterus and have infections, but will also have an increased mortality among his babies. I do think, however, that if every one who is doing operative obstetrics, will go to Buffalo and see Dr. Potter work and learn how he does his operation, he can get a great deal of valuable information and improve the results he has had in versions in the past.

DR. ABRAHAM J. RONGY, NEW YORK CITY.—For four years I have opposed Dr. Potter's teaching and I am still of the same opinion. However, through the kindness of Dr. Potter I had the opportunity of witnessing two versions performed by him. Since then my reason for opposing his teaching became still greater because I found Dr. Potter to be a master in obstetrics and I dare say that there is no one in any lying-in hospital in the United States that knows how to perform versions so well as Dr. Potter. I honestly believe that it is still a dangerous procedure to be applied by the average obstetrician in any of the lying-in hospitals.

What Dr. Potter can do very few of us are able to do as far as version is concerned, but I do want to reiterate that this procedure must not be made light of otherwise it will be undertaken by those not competent to perform it.

DR. HERMAN E. HAYD, BUFFALO, N. Y.—You cannot imagine how pleased I am to hear the obstructionists endorsing the excellent work of Dr. Potter which they saw in Buffalo, some of the results of which he presented to the Association some years ago. At that time, as many of you know, his statements were questioned and he was thought to be not only unscientific but dishonest.

It seems to me it is an absurd position for Dr. Rongy to take when he says that even a skilled and experienced obstetrician cannot do this work as well as Dr. Potter. I will admit that with such an arm as Dr. Rongy has he will not be able to do it as well as Dr. Potter but yet he will do it without danger to mother or child.

When we go to witness the Mayos operate, or to see Dr. Crile operate, we see the masters and yet many of us do some of our operations in the abdomen just as well and as skillfully as Dr. Crile and the Mayos do them. You can do this operation of version well if you go to Buffalo and learn how to do it properly. It is absurd to say that Dr. Potter has supernatural powers. He has simply had a lot of experience and he is just as skillful in doing version as Dr. Crile is in doing thyroid operations. Dr. Crile may beat me in doing a thyroid operation, he will beat me in time and in technic, but my patients all get well the same as his.

Just think of it, gentlemen, in the city of Buffalo we have about 13,000 children born every year. We probably have over 800 doctors, besides all the midwives, and yet Dr. Potter delivers over one-thirteenth of the babies born in Buffalo. You can hardly believe that, but he has shown by his records that there is nothing better in the whole world. Last year he did not have a death; this year he has had two deaths, one of them with pneumonia after the woman left the hospital, and another one forty days after delivery with some kind of infection. There is no record in the world of which I am familiar that can touch it, and what is the explanation? The explanation is, first of all, asepsis; second, profound anesthesia; third, no traumatism to a latent gonorrheal pus tube; no injury of any of these tissues that produce infection that will go on for two or three or five or six weeks. There is the elimination of pain; a certain amount of individual recreation to the obstetrician so far as the work of obstetrics is concerned. Of course, when I say recreation, I mean that he can do this work

just as you and I do an operation. When a patient is in labor he makes an examination, and from his experience he knows in half an hour whether dilatation will be sufficiently advanced and then he can make the necessary delivery.

It has been said that this must not be taught in an Association like this, it will do harm. I do not think it will do any more harm than when you teach students the way to do abdominal section and because a thing may have some evil attached to it we must not lose the good it may have also. The ordinary doctor is not supposed to do this kind of work, and he does not do it and he cannot do it, but that does not militate against a first-class, trained man doing it. Yes, we have in our Association a man, who is the only man that has ever brought anything new in obstetrics in the last fifty years, outside of aseptic surgical practice.

DR. E. GUSTAV ZINKE, CINCINNATI, OHIO.—When Dr. Potter presented his first paper, five years ago, there was not a man present who supported him in his practice, and it was very hard to restrain the members from having him expelled from the Association. There is no rule without an exception. I am the exception in this case, for Dr. Potter taught an old man a new trick. While I did not believe everything he said at that time, I did not think he was lying, for the manner in which he presented the subject was so impressive that any man who had listened to him attentively felt he was sincere, and I asked the members to deal kindly with him; to wait and see. I went to Buffalo, therefore, to observe him at his work. He performed several versions in my presence, and did them most skillfully and successfully. He is able to teach the younger men how to do his work, and there is where lies his chief merit. Think of a man's delivering 1100 women, personally, within a year! That is a marvelous accomplishment in itself. Of course, we must not forget that he lives in his automobile; he sleeps upon the floor in the patient's home; he rests almost anywhere, in any position, under all conditions. He is devoted to his patients and to his practice. It is the duty of every man who attends to the practice of obstetrics, and who intends to practice it in the future, to see Dr. Potter while he has an opportunity, for we never know how long Dr. Potter may last, and his method of practice should not be lost. It is undoubtedly of benefit to suffering womankind. It helps the obstetrician; it saves suffering; it saves lives.

DR. WILLIAM G. DICE, TOLEDO, OHIO.—I do not dread breech cases as I formerly did, especially cases of extended arm, after seeing the work of Dr .Potter and with what ease he manages the arms. Delivery of the extended arm is now made by me in accordance with the method he has described.

I think it would be of interest to those here, because he has undoubtedly taught a number of men, if he could give us definite statistics of the work of these other men which would possibly throw some light on the ability of those less skilled to do this work.

A question which has come to my mind is that I see rupture or bursting of the membranes early in labor, and frequently before labor begins, and of course we have then a different situation with which to deal. I simply wish to ask in regard to these cases of dry labor, whether he has any greater difficulty in dealing with them.

DR. JAMES A. HARRAR, NEW YORK CITY.—I would like to emphasize a few things, the omission of which may have been noticed by those of you who have seen Dr. Potter work. First, that he uses his left arm in going after the feet, no matter how the baby lies; second, the extreme deliberation with which he makes the breech extraction. It is a continual glacial-like movement of the child. You see not one inch being born instantly; third, the pressure of the rigid fingers of the external hand just above the symphysis and below the uterus digging in to deliver the head through the brim; and last, the gentleness and unconcern with which he handles the newborn child. The babies are not spanked or tubbed. He strips the pharynx ex-

ternally, lays the baby down and turns to the management of the mother. In seven or eight or ten minutes the baby begins to whimper and the spectators breathe more freely.

DR. POTTER (closing the discussion).—I feel I owe a great deal to Dr. Zinke and Dr. Hayd for the manner in which they have discussed this operation. The first time I heard Dr. Zinke discuss this subject I thought he would have a stroke of apoplexy, and I thought I would be hanged for murder. (Laughter.) Since the Indianapolis meeting we have been doing versions more frequently each year.

Dr. McPherson spoke about the delivery of the aftercoming head. There is a maneuver that is of great assistance. After the shoulders are out, the operator puts the first two fingers of his left hand in the child's mouth, and with his right hand above the mother's symphysis aids flexion of the head, and makes what pressure is necessary on the aftercoming head, but we never make pressure on the aftercoming head until the shoulders are out. We do not get the arms over the head. We do not get any locked shoulders. I do not know anything about that, although other practitioners say that they have it and why do not I get it? It is because they push the head down between the shoulders, the head being a movable body goes between the shoulders and up go the arms, and then you have extended arms every time. You should get the shoulders out first and the head flexed in the pelvis and guide with your fingers in the child's mouth. If there is any assistance needed, I now have my anesthetist help with the aftercoming head. With gentle pressure from above, the head now passes through the pelvis, being guided by my fingers in the child's mouth. If it is necessary, I put forceps on to raise the aftercoming head and finish the delivery with forceps.

One man who has seen me do this work has done a hundred and fifty of these versions without any difficulty in the past year. Another has done 121. I presume there are others who have done fully as many without any trouble. Many practitioners are doing this operation in their various localities.

Dr. Rongy said it should not be taught. It has been taught to these men, and I do not hesitate to say it can be taught to competent men.

So far as Dr. Dice's remarks are concerned, he must not lose sight of the fact that a breech presentation is a different proposition from a version. In a version we have flexion, and when once we lose flexion we are lost; when we have a breech, we get the head extended. In version we maintain flexion.

As to the point made in regard to rupture of the membranes, I do not think that is any bar to version. If the uterus is relaxed under anesthesia so I can lift the head up, I perform version. I use my left hand in the uterus because it is easier for me. Slowness is a matter of necessity. The time it takes to do this operation is variable. In some cases I have been twenty-three minutes in delivering the baby. We do not spank the child; we do not put the child in cold water. I use a small catheter in the larynx for resuscitation, and start with a little manipulation of that catheter, pressing the air out. That is seldom done, however.

DR. EDMUND D. CLARK, of Indianapolis, Indiana, read a paper on **Fibroids of the Ovary.** (For original article see page 603.)

DISCUSSION

DR. OTTO H. SCHWARZ, ST. LOUIS, MISSOURI.—I was not under the impression that ovarian fibromata were as rare as the doctor stated. Ovarian myomata, however, are very rare. It has been very difficult for me to decide

whether solid ovarian tumors which answer the description of fibromata were made up entirely of connective tissue or also contain some smooth muscle tissue. Recently I have observed three very interesting cases of fibroma of the ovary. In one instance a very large tumor about the size of a grape fruit arose from the ovarian ligament, slightly stretching the lower pole of the ovary. Directly opposite the site of the normal ovary on the surface of the tumor was a papillary excrescence which on section proved to be normal ovarian tissue. The structure of the tumor for the most part was connective tissue, but there was also definitely present some fibers of smooth muscle tissue.

Another case was a fibroma of the ovary about the size of a hen's egg which was definitely encapsulated. The surrounding ovarian tissue, very much thinned out, served as the capsule.

A third case was a small pedunculated fibroma arising from an otherwise normal ovary. The tumor measured 10x5x4 mm., and was similar to the normal ovarian cortex in structure. This case represented a fibroma in a very incipient state.

DR. ARTHUR T. JONES, PROVIDENCE, RHODE ISLAND.—I should like to add one more case of fibroma of the ovary to the literature. I think many of these cases are confused with sarcoma of the ovary. The first case that came to my notice I diagnosed as fibroma of the ovary. In that instance the pathologic examination proved it to be a sarcoma. Since then I have had five cases of which I have made note. In my opinion it is hard indeed to differentiate grossly between sarcomas and fibromas. This case that I diagnosed grossly as one of sarcoma, on pathologic examination proved to be a pure fibroma.

DR. JAMES F. BALDWIN, of Columbus, Ohio, read a paper entitled **Some Indications for Hysterectomy.** (For original article see page 609.)

DR. ADAM P. LEIGHTON, JR., of Portland, Maine, presented a further report on the administration of **Corpus Luteum Extract.** (For original article see page 613.)

DISCUSSION ON PAPER OF DR. LEIGHTON

DR. SAMUEL W. BANDLER, NEW YORK CITY.—Every paper which deals with the endocrines is a contribution whether it carries with it a theory or ideas contrary to a theory. If anything makes a man realize that the human body, as well as the human mind, is a complex organism, the treatment of which cannot be guided by any definite rule, it is the study of the endocrines. What will help one thing will not help another. There are certain rules we ought to follow and this paper mentioned something about the ovarian extract. I will be brief and simply state my own opinion with due deference to the experience of others. I use corpus luteum extract more frequently than ovarian extract or ovarian residue. Dr. Leighton uses corpus luteum with menorrhagic symptoms occurring at any time, especially at or preceding the menopause. The theory is that ovarian extract or ovarian residue stimulates menstruation, whereas corpus luteum extract inhibits or delays menstruation, and it acts as effectively as placenta extract does in making menstruation late. We know that the thyroid swells a few days before menstruation, and that it enlarges enormously and to the patient's benefit during

pregnancy. The thyroid gland has a specific effect in menstruation, and in nidation of the ovum it has a specific effect in keeping the ovum where it should be and limiting the overcontraction of the uterus so as not to end in abortion. Most of the miscarriages occur at the menstrual period. The average woman tries to menstruate all during pregnancy, but is inhibited wholly by corpus luteum and placental extract and thyroid. All three hold the posterior pituitary, which acts when the woman is in labor, in check. If they do not hold the posterior pituitary in check, pregnancy goes on until the fourth or sixth month, and we call it a miscarriage. The corpus luteum stimulates thyroid activity before menstruation and still continues to stimulate it normally during pregnancy. If the thyroid is not stimulated during pregnancy, the toxemia of pregnancy, with involvement of the kidneys, comes about. I am almost prepared to state that a young woman with a very good thyroid never or rarely has a dangerous toxemia of pregnancy. So you have the thyroid and corpus luteum and placental extract acting in opposition to the pituitary. The time when corpus luteum would seem to be of the greatest benefit is in or about the menopause, because there, after all, you are dealing more with menstruation practically *in toto* by interrelation among the glands than at any other time. Even flushes and flashes at the menopause period are due more to overactivity of the posterior pituitary than to any other one thing, and since corpus luteum does oppose the posterior pituitary, it is the logical one to use. However, it will act in some cases where it will not act in others at all. In still other cases the whole ovarian extract or the placental extract, will not act. Absolutely nothing acts.

I saw for the first time a journal printed in German about two weeks ago in which a man reported the effect of the various endocrine glands on menstruation, and he tabulated 150 cases by one man who used corpus luteum for one purpose, and 150 cases in which another man used it for a totally different purpose, and both were eminently satisfied with their results.

DR. JAMES E. KING, BUFFALO, NEW YORK.—I think Dr. Leighton's contribution to this subject is a very valuable one because he has put it before us in a judicial and very sane way.

Dr. Bandler's closing remarks, it seems to me, cover the situation pretty well regarding the administration of these remedies, because I think our enthusiasm in any line of endeavor tinctures our opinion as to the results obtained. Personally I feel that in so far as ovarian extract or corpus luteum is concerned in therapeutics, they are very uncertain agents, so uncertain that I believe every time we administer these remedies we are doing it empirically and simply as an experiment. The only endocrine substance I have been able to give and have been able definitely to say beforehand I was going to get results, is thyroid extract to control bleeding in women approaching the menopause, in whom there are symptoms of a mild myxedema. In these cases only have I been able to feel I could say definitely I was going to get the result I expected.

In regard to corpus luteum and ovarian extract, I have never been able to say with any degree of certainty that I was going to get the results looked for, and that is the experience of Dr. Bandler who was really the first to emphasize the point. I think Dr. Leighton's work has contributed a great deal toward that end. Much of what we know about the endocrine system has come from therapeutic endeavors to correct the pathologic effect of the glands and a better knowledge of their physiology.

DR. GREER BAUGHMAN, RICHMOND, VIRGINIA.—One word in regard to the use of the corpus luteum in the vomiting of pregnancy. When Dr. Bandler said a thick necked woman is a safe pregnant risk, he has said a very important

thing. Hypersecreting thyroid is one of the things I look for in a pregnant woman. If she has a thick neck I feel comfortable about her pregnancy so far as toxemia is concerned.

The only change I have made in the treatment of the vomiting of pregnancy has been the addition of corpus luteum to my plan, and since I have been using it, I have had only one case, who could vomit at will, that had to be aborted on account of vomiting of pregnancy.

Whether corpus luteum has done the work, or whether it has been my good luck, I do not know.

DR. ABRAHAM J. RONGY, NEW YORK CITY.—The only really good results that we see from the use of corpus luteum are in those cases which suffer from habitual abortion. I have had one woman who has been pregnant seven times and has never succeeded in carrying a child up to the point of viability. Others are those cases who give a history of abortion three or four or five times, and in whom everything else is eliminated. Those patients, if put on corpus luteum injections sufficiently early during pregnancy, have a chance of carrying the baby to the point of viability. I have had three such cases this year.

In regard to the use of corpus luteum in the early vomiting of pregnancy, I tested it out, and when the first report came out I was enthusiastic about it, and placed the patients in the hospital under proper surroundings, with proper care and proper nursing, and some of the cases responded very well, but only for a time. In a great many cases we did not get any results at all from the corpus luteum extract. Whether Dr. Hirst uses a different preparation or not, I do not know. I am not very enthusiastic about the use of corpus luteum extract in the early vomiting of pregnancy, but it seems to produce marvelous results in cases of habitual abortion.

DR. JAMES E. SADLIER, POUGHKEEPSIE, NEW YORK.—Stimulated by Dr. Leighton's paper of five years ago read at the Indianapolis meeting of this Association, I proceeded to give corpus luteum a further trial in the peculiar phases of the climacteric. I must say that in quite an extended experience with organotherapy in that particular phase, I have had fully 75 per cent good results. In certain cases bordering on practical psychoses, I have seen splendid results, and I quite approve of what Dr. Leighton said with reference to the long-continued use of it. Its temporary or transient use does not seem to produce effects, but continued over weeks and months, I have obtained satisfactory results. I have had no experience in combining it with the thyroid extract.

DR. HERMAN LORBER, NEW YORK CITY (by invitation).—I wish to call the attention of the Association to a combination of ovarian extract or corpus luteum with other endocrines in cases of sterility. Dr. Bandler has reported 130 cases. Not many of us have had such an extensive experience as he has. However, a few of us who have tried ovarian extract in combination with other thyroid or pituitary depending on the individual case, have seen marvelous results in many cases of sterility where all other medical or surgical means have failed. In not a few the administration of only a few capsules of the drug has proved of value.

DR. LEIGHTON (closing).—While I will grant that the paper just read, is incomplete, I do get results, and I am not afraid to make that statement! I will admit that it is hard to explain physiologically in many of the cases why one obtains results, and I wish it were possible for me to make a true explanation.

To obtain satisfactory results, we must have a fresh product, a point which unfortunately is not sufficiently considered. People go around to drug stores and

buy tablets which have been dried up or become damp. They cannot expect to have good results by using such a deteriorated product, and that is why they get toxic symptoms. The treatment must be prolonged. Many times men become discouraged if they do not notice results after short treatment. They have been told emphatically they must prolong its administration and yet they have often given up treatment at a time when they would see good results if they persisted. I have a great deal of faith in luteum extract in the early menopause symptoms and it is especially necessary to "get the patient under control." As I stated previously, the longer the neuroses of the climacteric have persisted, the more difficult it is to alleviate these distressing symptoms through the medium of this type of organotherapy. Regular, continuous ingestion of a fresh product of luteum extract is needed in any case where ovarian hypofunction is present, and in my experience, this substance must be taken for a couple of months, anyway, before satisfactory evidence of its action is shown, or its failure is assured.

OBSTETRICAL SOCIETY OF PHILADELPHIA.
MEETING OF NOVEMBER 4, 1920.

THE PRESIDENT, DR. EDWARD A. SCHUMANN, IN THE CHAIR.

DR. ALFRED C. BECK, of New York, read by invitation, a paper on **The Advantages and Disadvantages of the Two Flap Low Incision Cesarean Section, with A Report of Eighty-three Cases.*** (For original article see page 586.)

DR. IRVING W. POTTER, of Buffalo, N. Y., also read by invitation a paper on **Version.** (For original article see page 560.)

DISCUSSION ON THE PAPERS OF DRS. BECK AND POTTER

DR. BARTON COOKE HIRST.—I am very much interested in Dr. Beck's presentation as I think that I was the first to perform the low incision in this country. I saw the European operators do extraperitoneal sections in 1912 and I familiarized myself with the various methods. I do not feel that it is necessary to resort to this extraperitoneal technic in clean cases, results have been so good by the classical method. But in the presumably infected case, not only is the extraperitoneal route advisable during convalescence, but the extraperitoneal operation also is needed. Dr. Beck's technic does not protect the peritoneal cavity from contamination during operation. It is to secure this result that I have tried several procedures. I am not quite satisfied yet as to the very best way of doing it.

I cannot help envying Dr. Potter his opportunity for acquiring skill in the technic of version. I do not suppose anybody in the world has had such an experience as he. I don't think Dr. Potter would advocate the performance of this operation for every practitioner of obstetrics. I cannot conceive of any one advocating the delivery of every woman in the second stage or at the beginning of the second stage of labor by podalic version. Dr. Potter may be able to do the operation successfully, but I

*Dr. Beck's first paper on this subject was published in the *American Journal of Obstetrics and Diseases of Women and Children*, February, 1919. The paper presented herewith contains additional case reports and statistics based on observations made since that date.

doubt whether he claims that every practitioner can do so. I do believe we have forgotten the advantages of podalic version. There are many cases in which it might be utilized to advantage, and I think of late years there has been somewhat of a prejudice against it. I believe Dr. Potter's advocacy of his method will revive podalic version, but I would certainly hesitate to advise the delivery of every woman by podalic version.

DR. EDWARD P. DAVIS.—The operation described by Dr. Beck is not an extraperitoneal operation and it has been abundantly demonstrated that it is next to impossible to perform this operation in a purely extraperitoneal way. When this procedure was first advocated, it was claimed that it was especially adapted in infected and septic cases because the uterus could be drained through this suprapubic incision. I heard nothing from Dr. Beck concerning drainage, except the fact that where suppuration occurred, nature provided drainage by causing the pus to burrow beneath the peritoneal flap. The plan of the operation seems to be to protect the peritoneal cavity and to take for granted such protection will inevitably be adequate. While in the majority of cases this may be true, Dr. Beck has stated that in some patients suppuration occurs and makes its way externally, thus instituting drainage.

As regards the subsequent condition of these patients, it is inevitable that very considerable adhesions should form after the operation. Would not such adhesions interfere with a subsequent pregnancy and might they not disturb the general health and comfort of the patient? In operating upon a patient who had previously had this form of delivery, I found very extensive adhesions, which had caused great pain and had so distorted the birth canal as to make spontaneous labor impossible.

If the usage of different obstetric clinics be compared, it would be observed that cesarean section is more frequently performed for placenta previa than in the past. Would this operation be applicable in placenta previa? While we welcome any procedure or study which may increase the resources of obstetric art, it is necessary to study carefully the precise indications and limitations for operative procedures.

This is not the first time that I have had the pleasure of hearing Dr. Potter describe his method of performing version and extraction. His skill and success in this are evident, but this is one of the cases where it may be asked whether, because one man can do a thing so well, ought this to become general practice? The profession and public are indebted to Dr. Potter for demonstrating the success of podalic version and bringing it anew to popular use. Cesarean section has held the field of late, and it is well that attention be directed elsewhere.

It is interesting to observe that Dr. Potter uses chloroform exclusively as an anesthetic, and that he has failed to become fashionable by the use of nitrous oxide and oxygen. Chloroform has been recognized for many years as the ideal anesthetic for version, but so few at present are skilled and experienced in its administration that its employment has been largely abandoned.

It would be interesting to know whether Dr. Potter limits his performance of podalic version and extraction by pelvic measurements. It has been the custom of European clinics to state definitely that under certain measurements of the true conjugate podalic version and extraction should not be admitted. Does Dr. Potter rely at all upon pelvimetry, or does he estimate the size of the pelvis by palpation when the hand is introduced to perform the operation?

He states that he carries out this procedure to spare a woman pain and distress in the second stage of labor, and this we understand to be the chief reason for his action. His fetal mortality is comparatively high and he must, therefore, consider the comfort and condition of the mother as taking marked precedence over the safety of the child. An analysis of his statistics indicates that he limits his opera-

tive work largely to two operations, cesarean section and podalic version and extraction. He apparently rarely uses forceps and in the absence of spontaneous labor chooses one of these procedures.

We have recently had advanced the claim that as the great majority of women are more or less pathologic and not physiologic, so the great majority of labors are pathologic processes and are to be treated artificially. One writer strongly urges the use of forceps in the great majority of labors. Dr. Potter would employ version and extraction to limit pain and suffering and delay. Is obstetrics reaching the stage where spontaneous parturition will become a rarity? The answer to this question must depend upon a careful study of statistics, reliably obtained.

It is my opinion that Dr. Potter has rendered patients and physicians a great service by calling attention to an operation peculiarly adapted to many cases of delayed and difficult labor. Many patients in whom fruitless attempts to deliver are made by forceps could be more safely and more expeditiously delivered by version and extraction.

DR. RICHARD C. NORRIS.—Dr. Beck has not solved the problem of what operation will save the woman whose uterus is thoroughly and hopelessly infected. Dr. Davis has done that by taking out the uterus. I doubt not that Dr. Davis has taken out some uteri which Dr. Beck and others would not have removed. The vital question is: Is the woman's uterus hopelessly infected? Dr. Beck's tables are very gratifying to us. They show that hopeless infections are relatively rare. We have no scientific, exact method to determine hopeless infection and until we have it is wholly impossible to choose with precision the operation that will avail in suspected cases. In a recent case where craniotomy was suggested, I did Dr. Beck's operation, and the woman is alive and well today. If she had been in Dr. Davis' hands he probably would have taken out the uterus. I have had only 12 cases operated by extra- or transperitoneal methods. The last five or six have been by Dr. Beck's technic. I think his operation is the best one we have of the so-called 'low transperitoneal operations.' It protects the peritoneum and provides extraperitoneal drainage. If the infection is in the placental site and you operate below, you give the woman a chance to combat the placental infection without the added risk of peritonitis by extension through the uterine incision, whereas, in the classical section, if you cut through the infected placental site you expose the patient to a greater risk. Dr. Beck exhibits interesting temperature charts but I am by no means convinced that they prove the point. The temperatures may be due, in part, to the widespread trauma and oozing incident to the technic. We must look to the laboratory to find some way of telling us how serious the individual case may be. We shall not have the proper appraisement of the low operation until we know that. We cannot settle it by saying that Dr. Beck's method is going to save all infected cases. He does not make that claim. When in doubt I would do the low operation; when I believe the case hopelessly infected I take out the uterus. With our present inexact knowledge each operator must judge for himself and our judgments will vary.

Dr. Potter's infant mortality is about eight per cent. He delivers the anterior arm first. He must have some cases of high arrest of the head with extended arms. Would that be the technic for such cases? How often does he push the head out of the pelvis before version is attempted? How many x-ray pictures has he had taken to prove the absence of fractured arm or clavicle when the head has been high and the pelvis small? With thirty years' experience I find I have to get my fingers inside the uterus to extract the posterior arm. The unsolved problem in gynecology today that confronts the gynecologist is his inability to repair permanently the injuries to the upper pelvic diaphragm. Version and rapid extraction which are often necessary in some obstetric emergency, often the result of too early

interference, are factors producing such injuries. Artificial methods of dilatation of the upper pelvic diaphragm cannot equal nature's method. I am not convinced that extraction done even at the time Dr. Potter elects (and there are some cases that permit no delay), protects that upper pelvic diaphragm from the injuries we know result from rapid labors, from early forceps, from pituitrin, from any manipulation that interferes with or anticipates nature's mechanism of dilatation. I would like to examine Dr. Potter's 900 patients before I should be willing to believe them better off as to their birth canals than after vertex presentations.

DR. GEORGE M. BOYD.—The flap splitting low cesarean operation like other modifications of the classical operation, is suggested by its advocates with the hope that we may thereby minimize adhesions and diminish the danger of infection. If it accomplishes these indications, then it would be the operation of choice, particularly in the case exposed to infection. If the patient is potentially infected, I do not think it is indicated. In these infected cases, the infant is usually dead and does not demand consideration. In such a case it would therefore be better to perform craniotomy. The flap splitting low cesarean operation is more difficult to perform in my opinion, than the classical operation and the infant is not as easily delivered. If these facts are true, then it is essential for the advocates of this procedure to prove their claim that there exists less danger of infection by this method. It will require time to prove that the mortality is lower than that of the classical operation. In 1919, Dr. Beck reported a mortality study of 107 cases operated upon at the Long Island College Hospital. In all, there were six (6) maternal deaths. He deducts two (2) deaths from eclampsia as not coming under the direct province of his paper, leaving 105 cases with four (4) deaths, 3.8 per cent. I have done in all, 104 sections with three (3) deaths. The first and second deaths were due to infection, both cases entering the hospital late in labor. The third death occurred three weeks after operation. The patient had a normal convalescence, was out of bed and ready to leave the hospital when she was suddenly taken with dyspnea and died immediately from a pulmonary embolism. If we deduct this last death, the mortality was two (2) maternal deaths, 1.96 per cent in 103 cases. In these 104 cases, 60 per cent had the test of labor. In many, the membranes were ruptured and labor complicated, in one case by prolapse of the funis and in another by prolapse of the arm. The classical operation, as before stated, was done with one exception, when hysterectomy was performed. We have tried out the several methods of suturing the uterus and believe the safest method to prevent leakage and subsequent rupture of scar, is a through and through suture of fine silk. I believe, therefore, that it will require the test of time to prove out the advantages of the method of operating described by Dr. Beck. My feeling is that as the dangers of cesarean section are due to the condition of the patient at the time of the operation, obstetric judgment for or against section is more important than is the particular method of operating and that the patient potentially infected, will probably die by any method of section.

Dr. Potter presents to us an ancient operation in a new rôle. He has personally delivered eleven hundred (1100) women in one year. This was a gigantic task. In these cases he has made nine hundred (900) versions. He resorts to this ancient operation to cut short the course of normal labor. Obstetrics is a time-consuming specialty. It is not surprising in this day, that from time to time, obstetricians have suggested and defended a method of conducting labor which cuts short its normal length. Ergot and pituitary extract have been resorted to. Manual and hydrostatic dilators have been used. Labor by appointment is suggested. In all of these measures mentioned, interference is carried out early or labor actually induced. Dr. Potter resorts to version as a means of cutting short the normal length

of labor. So that version, as an operation for a special indication such as hemorrhage or faulty presentation, is not the subject for discussion. He resorts to internal podalic version when the first stage is completed or when the cervix is dilatable. If it is harmful to cut short the normal course of labor, Dr. Potter's method in some respects is less dangerous than the methods previously mentioned, because he does not recommend it until the first stage of labor is completed or the cervix dilatable. On the other hand, it is more dangerous, for he advocates for the purpose a major obstetric operation. The chief lesson I have learned in serving the Philadelphia Lying-In Charity for the past thirty (30) years, is that many of the complications and tragedies that we witness today in obstetrics are brought about by too great haste on the part of the attending physician, a tendency to ride rough shod over the principles laid down by the old masters in our art and attempt to solve the problem in the quickest way. While this tendency is in accord with the spirit of the times, I feel that we often invite trouble by attempting to cut short the normal length of either pregnancy or labor. I am in accord with Dr. Potter so far as he resorts to version for a specific indication but do not believe it is good obstetrics to interfere with the normal course of labor by any major operation.

DR. ALICE WELD TALLANT.—I am in accord with what Dr. Norris said about Dr. Potter's fetal mortality of 8 per cent. Ten years ago when I went over our work, including cesarean sections and all sorts of cases, our mortality was not above 5 per cent. We find in our service that women would rather suffer in the second stage and have a better chance of having a living baby.

DR. JOHN A. McGLINN.—Dr. Beck in his paper falls into the usual fallacy of advocacy of this operation in the prevention of infection. He did not speak of the great value of the low incision and the covering over of the wound to prevent adhesions. In considering how these operations may prevent infection one must consider the course of infection. Very few operated by cesarean section die from peritonitis. The operation of Dr. Beck does not protect the peritoneal cavity from the spill. It does, however, protect it from suture infection. Dr. Norris spoke of infection in the high incision. In the low operation you have a point of drainage; drainage cannot escape anywhere except into the uterus. In many of the puerperal infections I take the uterus out because these other operations do not cover the question of infection. We have no method by which we can tell what cases may become infected. I cannot see how this operation will protect if you leave the uterus in.

DR. STEPHEN E. TRACY.—A few weeks ago I was much impressed by a paper on Podalic Version presented to Dr. Potter. Since then it has been my privilege to see him deliver, in one day between 5 A.M. and 5 P.M., six patients by podalic version. There were many things about his work which were striking, and one that impressed me the most was the accuracy with which he could estimate the time of complete dilatation. To illustrate, he called at the hotel one morning about four o'clock, and took us to a hospital, and immediately began to prepare for the operation. When the procedure had been completed, he announced that we would go to another hospital and deliver a patient who was ready. When we arrived at the other hospital, he began immediately to prepare himself for the operation. He invited me to examine the patient and she was certainly fully dilated. About 11 o'clock we saw him deliver a patient at her home. That was the twelfth delivery on that patient, all by podalic version. While her pelvic tissues were greatly relaxed, there had been no frank laceration. With this patient he had slightly more trouble in delivering the head, than with the other patients, really no actual trouble, but it took a few seconds longer than usual to get the head going nicely. About one o'clock in the afternoon, he 'phoned us to meet him at the Children's

Hospital at 3:15 o'clock. At intervals of half an hour, he delivered three patients. The last was a primipara. From the time he started to "iron out" the perineum until the delivery had been completed, and the patient ready to be turned around in bed, a period of twelve minutes had elapsed. After delivery Dr. Potter exposed the parts for examination, and there was no laceration, not even a break, in the mucous membrane in any one of the six patients. The deliveries were absolutely clean. There was not a stain on the Doctor's gown or on the uniforms of the nurses who held the patient's feet, nor in fact on anything. During my short visit, I studied the charts, and saw at least 25 private patients who had been delivered by podalic version. Some of the patients had been delivered a day or two, others were out of bed and ready to go home.

Of these patients, one had a temperature of 100° F. one day, another had a temperature of 99°F. for one day. With these two exceptions the temperature had been normal throughout the convalescence. It was rather startling to see a baby that had not uttered a sound wrapped in a blanket and put aside, but one unaccustomed to this procedure was soon out of suspense, as the babies all demonstrated promptly that their lungs were in perfect working order.

DR. NORMAN L. KNIPE.—Dr. Tracy did not say that Dr. Potter's work is even better on private patients. We saw him deliver eight private patients in two days. He seems to increase his reputation and does not tire himself out by doing a lot of free work. I have been impressed with his gentleness, manual dexterity, and the slowness with which he did the version. I quite agree with the speaker in Atlantic City who said that Dr. Potter had given us the one new thing in obstetrics in the last twenty years.

DR. COLLIN D. FOULKROD.—In my own private practice I find I have fully sixty and sometimes seventy per cent occipitoposterior positions. In our earlier teaching we found a great number of occipitoposterior position patients who required version as the simplest method of delivery.

DR. JOHN COOKE HIRST.—It was my good fortune to deliver two patients in their second childbirth upon whom Dr. Potter had done version, and the pelvic condition of both I would consider absolutely perfect. On neither patient had any repair been done. The blood pressure of one was 240, the parts edematous and badly swollen. This patient was delivered by version in the usually short length of time that Dr. Potter takes. When I saw her in her second childbirth the pelvic condition was most satisfactory. I think Dr. Potter's technic, which can secure such results, is worthy of admiration.

DR. BECK (closing).—Dr. Hirst does not regard this as an extraperitoneal operation in its fullest sense. We do not claim that the operation is extraperitoneal. It is an intraperitoneal operation with an extraperitoneal closure. In twenty-four hours the wound is perfectly sealed by the peritoneum. I know this to be an actual fact because of a death following the original procedure in which the lower part of the broader flap was firmly adherent.

Peritonitis following cesarean section occurs as the result of one of four things. It may occur as the result of faulty operative technic. It may occur as the result of the spill of contaminated amniotic fluid, or by extension of puerperal infection through the lymphatics as is the case in the majority of deaths from peritonitis following delivery from below. This operation does not prevent any of these. The great majority of deaths that have occurred from peritonitis following a classical operation, in our previous experience, occurred as a result of extension through the uterine wound. The uterus was infected and the wound itself broke open. The operation prevents the extension of a puerperal infection by this most frequent route.

Since we have been doing this operation we have had much less care in the selection of our cases for cesarean section. The operation does not prevent infection in the uterus, but we believe it does prevent extension to the peritoneum in many cases. Therefore I feel that our results have shown it to be relatively safe in suspicious cases. As nearly every man has stated tonight, a patient may have been in labor a long time, perhaps has had a number of examinations; we do not know whether she is infected, a certain percentage are. The infected cases we feel have an added protection by the flaps and by the low incision.

With regard to the use of this operation in elective cases, Dr. Polak has been using it routinely from the middle of last year. Every one who has used this operation in a sufficient number of cases has found that there are definite advantages even in elective cases. One advantage is in the matter of hemorrhage. There should be less hemorrhage from this operation because of the fact that the placental site is so seldom in the lower uterine segment. Then again, if we have a tired out, flabby uterus which does not contract and the only way of controlling the hemorrhage is by hysterectomy, we may do the latter very easily after this type of cesarean section.

While we have not opened any of these cases subsequent to operation we feel there are certain advantages when the scar is in the lower uterine segment over that in the upper. The lower segment is passive and healing should take place here more readily. The scar in this operation is in precisely the same area as in the vaginal hysterotomies. We do not often hear of their rupture in the latter. The convalescence following this operation is much smoother than when we used the high incision routinely. I used to do my cesareans according to a technic much as Dr. McGlinn describes. Almost invariably when the patients were reoperated upon, adhesions were found. It seems reasonable to expect fewer adhesions as a result of better peritonization. I doubt very much whether I would suggest this operation in placenta previa on account of the danger of hemorrhage. I have encountered a placenta unexpectedly in three cases. In two there was not a very marked hemorrhage. In the third the bleeding was very profuse.

DR. POTTER (closing).—Dr. Hirst asks whether I advocate version for every one. I don't advocate it for any one if they do not want to do it, but especially trained men in obstetrics should be able to do version just as well as cesarean section. It is for the professor of obstetrics to decide whether he shall teach the men to do version. I don't do version in a flat pelvis. The anterior arm is delivered more easily than the posterior, for some reason which I have not found out. I have not tried using half the forceps, nor have I x-rayed or made inquiries to know whether there were fractures because I did not think it necessary. I know there were none. We have no use for the bags; we do not know what you do with them. I don't believe there are any injuries about what we are pleased to call the upper pelvic diaphragm, and I think the cervix in my cases is higher than it used to be when I didn't do version.

The 1113 women as stated in the paper I delivered myself. In 80 per cent I did version, 13 were footlings; 13 delivered themselves before I could get there; 12 cases were delivered as vertex cases; 3 were face cases. I am glad if you have any fetal mortality not above 3 per cent. I don't know what caused the convulsions in my case; five died from inanition, and that cannot be laid to the method of delivery. There were three monsters.

Department of Reviews and Abstracts

Conducted by Hugo Ehrenfest, M.D., Associate Editor

Collective Review

The Ovary and Its Physiologic Functions

By S. S. Schochet, M.D., Chicago, Ill.

THE concept of the physiologic processes of the female genitalia, as generally accepted, has undergone extraordinary changes in recent years. Yet in spite of the great, indeed wonderful progress that has been made during the last two decades, the mysterious function of menstruation and ovulation continues to occupy a prominent place in the thought and problem of gynecologists. Both of these important problems are essentially of a physiologic character, which reflect fundamental laws that have a close bearing upon practical gynecology, as well as on the general problems of biology.

The biologic investigations are largely in the morphologic stage: in the main by reason of the fact, that the morphology offers greater difficulties to an adequate explanation and interpretation than the physiologic processes.

The contributions to our knowledge are mainly pieces or parts of pieces, limited to one phase of the subject, restricted to one portion of the internal genitalia and covering only a meager subdivision. Aside from these fundamental problems, there are the endocrine glands, which in a measure are of more immediate practical interest in regard to questions of development, monstrosities, and sex differences.

HISTORICAL

The earliest mention of the ovary is accredited to Herophilus (Alexandria, 300 B.C.) and received its name from Steno in the seventeenth century A.D. (Fasbender).[1]

GROSS STRUCTURE

The ovaries are organs which belong to the class of externally secreting glands and ductless glands. The reproductive glands represent a different class from any of the other externally secreting glands, for their secretion-products, although discharged by a duct (fallopian tube) on a free surface, do not merely consist of substances formed in and extruded from cells, but of complete cells (ova) which become detached as such from the ovary that forms them, and are carried away from it along with a fluid (liquor folliculi) likewise produced by the gland. Minot[2] places the ovary along with the organs which produce the erythrocytes and leucocytes under the general head of cytogenic glands.

The ovaries are two small, somewhat flattened, solid-looking ovoid bodies lying one on each side of the pelvis, and projecting into the

peritoneal cavity at the posterior part of the broad ligament, which is itself formed of a fold of peritoneum. The ovaries of different women vary much in size apparently without any relation to fertility. In the nullipara the ovary presents a more or less smooth surface; in older women, it becomes larger, more round and irregular in outline due to the maturation of the follicles. After menopause the ovary shrinks, and in old women, it may be as small as a navy bean and made up chiefly of fibrous and scar tissue.

The surface of the ovary is covered with a single layer of cuboidal epithelium. In very rare instances this may be ciliated (von Velits and Williams).[3] Although it is the direct representation of the embryonic hypoblasts, its function is only protective. It is stated by Bland-Sutton[4] that the ovary is sometimes surrounded with a peritoneal hood, which is the homologue of the *tunica vaginalis testis;* but this statement lacks confirmation by other observers. Graves[5] attributes extraordinary potentialities for growth to this layer and considers this the chief factor in the etiology of parenchymatous ovarian cysts.

It is not the intent and purpose to give a minute and complete resumé of the embryology of the ovary, especially as to parental characteristics and variations, the origin of sex and growth; yet an accurate idea of the structure of the ovary can only be clearly understood by a study of its development.

Although important preliminary contributions were made by Valentine[6] and Pflüger,[7] it was not until Waldeyer[8] in 1870 published his epoch-making monograph upon the ovary and ovum, that a more accurate description of the development of the chick ovary was obtained. He found that the celomic epithelial cells covering the wolffian body became larger and differentiated from the surrounding tissues. This epithelium was designated as germinal epithelium, and its cells soon became differentiated into two groups. The large clear cells or primordial ova surrounded by the second group of small epithelial cells, which extend downward as Pflüger tubules, or egg nests. These are broken up into smaller and smaller masses, until eventually isolated primordial ova are found which are surrounded by a single layer of epithelium. Nagel,[9] Klein and von Franque[10] have observed occasionally more than one nucleus in the primordial ovum.

Recent observations, however, have thrown some doubt on the real site of origin of these cells, for in the elasmobrachii they have been found to be formed by emigration of cells from the yolk sac. This is also true of an early human embryo of 4.9 mm. in length. Ingals[11] has described large sex cells under the peritoneum at the root of the mesentery in the region of the first five trunk segments.

If further investigations should show these observations to be correct, then primitive sex cells must be considered differentiated during the very early division of the fertilized ovum, as is the case in the lower classes of the animal kingdom.

It is entirely unknown to us how the transformation of undifferentiated cells into sexual cells is accomplished. One can observe with the microscope alterations in the structure of the cells, but the cause of this alteration remains a hidden mystery. (Minot.)[12]

It would indicate that the ova are not formed in the embryo as a whole but from early differentiated cells of the fertilized ovum. The germ-plasm would be the continuous stream of living substances connecting all generations (Wilson).[13]

Weissmann[14] concludes that protoplasm possesses the property of potential immortality. This latter part of his theory has been the subject of much interesting investigation[15] with some contradictory results. It has been shown by Woodruff[16] that a specimen of paramecium isolated and kept in a varying culture medium during a period of five years "possessed the potentiality to produce similar cells to the number represented by 2 raised to the 3029th power or a volume of protoplasm approximately 10^{1000} times the volume of the earth.

In a later paper Waldeyer[17] (1901) states that the formation of primordial ova was not as simple as he previously described but was a very complex process. This was later confirmed by the work of Nagel,[18] Skrobansky,[19] and McIllroy.[20] The researches of Winiwarter[21] have shown that the changes occurring in the cortical zone derived from the germinal epithelium are of a very complex character.

THE MICROSCOPIC STRUCTURE

The general structure of the ovary can best be studied in cross section, when the organ is seen to be made up of two portions—the cortex and medulla. The primordial ova and graafian follicles are situated in this outer layer or cortex. It is composed of spindle-shaped connective tissue cells, throughout which are scattered the primordial ova and graafian follicles in various stages of development. In the most external portion of the cortex there is a single layer of cuboidal cells, resting upon a thin layer of fibrous tissue, which gives the ovary its whitish appearance, and which is called the tunica albuginea.

The medulla is composed of loose connective tissue and contains large numbers of blood vessels, both arteries and veins; and, according to His,[22] Köllicker[23] and Rouget,[24] a considerable number of non-striated muscle fibers, whose presence caused the last named observer to class the medulla among erectile tissues. The exact arrangement of the blood vessels has been studied exhaustively by J. G. Clark.[25]

According to Waldeyer[8] each ovary at birth contains at least 100,000 oocytes, the majority of which disappear before the age of puberty; so that at this time only 30,000 or 40,000 remain. It is explicitly added that this is merely an estimate and probably too low rather than too high. All authorities do not agree on the number of oocytes. Henle[26] estimated the number of follicles in an eighteen-year-old woman and stated that there were not less than 72,000 ova in both ovaries.

Heyse[28] employed a more exact method and concludes that the number of follicles in both ovaries is 35,200. Sappey[28] determined the number of ova in each ovary as 300,000.

The most recent contribution is that of v. Hansemann[29] with the tabulated results of Hayato Arai.[30] He gives the number of ova in one (?) ovary of man at different ages as:

1 to 2 years	48,808
2 to 5 years	46,174
5 to 6 years	30,339
8 years	25,665
10 years	20,862
14 years	16,390
17 to 18 years	5,000 to 7,000

Though there is some doubt whether the numbers given by v. Hansemann are for one or both ovaries, yet they demonstrate clearly that there are many more ova present during the earliest years of life

than at puberty, and that even after puberty the numbers show a significant decrease. Marshall[33] states that not more than 400 ova reach maturity.

It is evident that a very large number of follicles, after attaining a certain amount of growth and development, undergo degeneration (atresia)—the ovum becomes shrivelled and eventually disappears; the follicular epithelium degenerates—a process shared by the theca interna; and the cavity remains for some time as an irregular cyst which eventually disappears. Stevens[31] has given an exhaustive account of the atretic follicle. Schochet[32] has shown that the liquor folliculi contains a proteolytic enzyme, and suggests that atresia is caused by the digestion, or alteration of the ovum by this enzyme.

THE INTERSTITIAL CELLS

Limon[34] has described accumulations of characteristic epitheloid cells, which are frequently observed in the neighborhood of the hilum in the fetus and in lower animals. These observations were confirmed by Aimé[35] and Bouin.[36] The origin of these interstitial cells is not clear, but as they are supposed to take part in the formation of internal secretion, they are designated as interstitial glands. L. Fraenkel[37] and A. Shaeffer[38] pointed out that the interstitial cells are absent in the adult ovary and are not constant in all species of lower animals.

Since the earliest work by Brown-Séquard[39] on the internal secretion of the testis, it has been generally conceded that the ovaries elaborate an internal secretion. Steinach[40] states that the internal secretion of the interstitial cells in the ovary has a specific influence in guiding the development of sexual characteristics. Some evidence for this view is found in the functional relationship that appears to exist between the ovary and other ductless glands. According to Hatai[41] removal of the ovary causes an enlargement of the thymus and affects the hypophysis and adrenals (decrease in weight). Shaffer[42] has shown that extracts of the ovaries contain two substances, one of which (interstitial cells) inhibits contractility of plain muscle, especially the muscle of the uterus, while the other augments this contractility.

The exact nature of the reciprocal relationships between the ductless glands cannot be explained at the present time. However, when one wishes to cloud or confuse the issue, or when one wishes to give an evasive answer, it is customary to refer to the ductless glands. Much further research is necessary before we shall be able safely to correlate the histologic structure with the hormonopoietic function of the interstitial cells.

NERVES OF OVARY

The nerves are derived from the ovarian plexus and are distributed in the ovary as three trunks. The fibers are chiefly nonmedullated, communicate very freely with one another, and are furnished with microscopic ganglia and with groups of specialized cells (phoecochrome cells of Winiwarter).[43] Winterhalter[44] has described a sympathetic ganglion of the ovary, but von Herff[45] denies the existence of a ganglion with the exception of a few sympathetic cells in and about the blood vessels. This coincides with the opinion of other investigators, Mandl,[46] and Vallet,[47] that the nonmedullated fibers for the most part are distributed along the blood vessels.

OVULATION

Ovulation comprises the growth, development and rupture of the graafian follicle. From birth until the cessation of sexual life, graafian follicles are constantly being developed. During the growth and maturation of the ovum, cells of the graafian follicle, after increasing greatly in number, begin to liquefy. It is thought, that the different chemical composition of the liquor, thus forming in the follicle, induces an endosmosis by which the liquor folliculi increases faster than would seem possible solely as the result of liquefaction of follicular cells. The follicle distends so that, following the direction of least resistance, one side of it approaches the free surface of the ovary, producing a bulging on this surface, a dispersing of the ovarian stroma, and the thinning of its tunica albuginea and the epithelium. The final result is a compression of the blood capillaries lying between the follicle and the ovarian surface. It was supposed by Waldeyer,[8, 17] His[22] and von Baer that nourishment was cut off from a preformed nonvascular area in the follicle, and that rupture was the result of atrophy of the stroma. The ovum is thus extruded with its granular epithelium cover by the liquor folliculi. This granular material when set free, takes up water, and therefore, as is specially noticeable in the ovum of the rabbit, swells up into a clear gelatinous envelope, which has been termed the albumin.

Clark[48] has shown that the conception of a preformed, nonvascular area is incorrect. He further states that there is a deeper lying cause for follicle rupture than mere growth and its pushing forward toward the ovarian surface.

Schochet[49] proved that the liquor folliculi contains a specific proteolytic enzyme, and suggests that ovulation is a result of the digestive action of this enzyme.

Simultaneously with the enlargement of the follicle, the nucleus of the ovum undergoes a succession of remarkable synaptic changes (Winiwarter,[50] Lane-Claypon).[51]

MENSTRUATION AND OVULATION

There are many observations recorded in regard to the time ovulation takes place in mammals. For instance Sobotta,[52] for the mouse, and Rubaschkin,[53] for the guinea pig, ascertained that ovulation occurs during heat and is independent of coitus. Loeb[54] has confirmed this last observation for the guinea pig.

For man, two opposing hypotheses have coexisted for a number of years. Gendrin,[55] Pflüger[7] and Bischopp hold that menstruation is dependent upon ovulation, and coincident with it. The opposite view, of which Riegel is the chief exponent, maintains that ovulation and menstruation are two entirely independent functions.

Clinical experience has substantiated this latter view, since it has been shown that ovulation and subsequent pregnancies have taken place without menstruation, as is demonstrated by the instances of conception occurring before the establishment of menstruation or after menopause, as well as during lactation.[56]

According to Heape,[57] ovulation and menstruation are not associated, since in monkeys, menstruation may occur periodically all the year round, but the season for ovulation and conception is limited. This has been confirmed by von Herwerden[58] for monkeys and aberrant lemur.

Runge[59] states that enlarged follicles are by no means uncommon in ovaries of young children. Loeb[54] has observed relatively large follicles in the ovaries of eighteen-day-old guinea pigs. From these numerous observations it must be concluded that ovulation and menstruation are two independent functions; but that the latter is absolutely dependent upon the presence of the ovaries.

CORPUS LUTEUM

Those graafian follicles that attain maturity and burst, develop into corpora lutea. Bischoff stated that the corpus luteum owes its origin mainly to the granulosa stratum of the wall of the empty follicle, which as it increases in extent occupies more and more of the follicle cavity. On the other hand von Baer considered that the corpus luteum was wholly due to a hyperplasia of the polyhedral interstitial stroma cells (of connective tissue origin) and thus represents cells of the theca interna together with a development of blood vessels. This view has been confirmed by the more recent works of Beigel,[60] Clark,[48] Hegar[61] and many others. However, these observations are at variance with those of Sobotta,[52] Stratz, Cohn,[62] Van der Stricht,[63] and Marshall,[64] who maintain that the corpus luteum owes its origin to a simple hyperplasia of the epithelial cells of the membrana granulosa; while Loeb[54] believes that the lutein cells are partly of connective tissue origin and partly of epithelial origin as observed in the guinea pig.

The structural appearance of the corpus luteum with its large cleft like spaces (lymphatics of His)[22] is not unlike that met in the cortical part of the suprarenal glands. Exner and Buckel do not confirm the existence of lymph vessels in the corpora lutea. The peculiar yellow pigment or granules in the cells give the corpus luteum its characteristic color. In its center we find a blood clot undergoing organization. Why a physiologic process like ovulation and menstruation should be associated with hemorrhage, is not definitely understood. Ries[65] emphasizes that every essential function of the female reproductive organs is associated with hemorrhage. Occasionally the central clot is absent, and such is the rule in many lower animals, as, e.g., in the rabbit and mouse. Later, the corpora lutea are rapidly absorbed, so that in a short time the degenerated lutein cells are replaced by newly formed connective tissue cells. These resemble closely the surrounding ovarian stroma cells. Clark[48] has estimated that if the follicles were obliterated by scar tissue, the result would be a fibroma 5000 times as large as the original ovary.

Various functions have been ascribed to the corpus luteum. De Graaf described it as a conglomerated glandular body, and it was considered by all earlier authorities a positive evidence of existing pregnancy. It is said that Sir Astley Cooper[3] and Denmann asserted under oath that a certain woman was pregnant because a corpus luteum had been found in one of her ovaries. Others believed that the presence of a corpus luteum indicated that the individual had indulged in sexual relations, or had at least been subjected to marked sexual excitement. It was not until after the appearance of the work of Bischoff, Raciborski, Negrier and Bouchet[3] that these fallacious views were abandoned.

The functional value of the corpus luteum was not appreciated before the epoch making investigations of Fraenkel.[66] In a later contribution, Fraenkel[67] states that the corpus luteum is a gland that is

renewed every four weeks in woman during her reproductive life, and at varying intervals in animals. It controls the nutrition of the uterus in a cyclic fashion, prevents it from either relapsing into its infantile or passing into its senile state; and prepares the endometrium for the reception of the ovum. If the ovum be fertilized the corpus luteum continues to exist and to maintain the augmented nutrition of the uterus during pregnancy. If the ovum is not fertilized, the corpus luteum merely produces the hyperemia of menstruation and then degenerates. There is strictly speaking only one corpus luteum, which regenerates itself periodically in slightly different situations and controls the uterine life from puberty to menopause. Menstruation is caused by the secretory activity of the corpus luteum, not by the pressure of the growing follicles on the ovarian nerves. The secretory activity causes the four-weekly hyperemia which makes possible the implantation of the fertilized ovum or leads to menstruation. Anomalous uterine bleeding and some forms of sterility may be due to pathologic conditions of the corpus luteum. Amenorrhea and uterine atrophy may follow the same cause. Lactation atrophy is a good example. During lactation, as a rule, there is no ovulation, therefore, no fresh corpora lutea are formed. This theory was substantiated by observations on the rabbit and also on woman (95 operative cases). If the corpus luteum was destroyed by a cautery the next succeeding menstrual flow failed to occur. This theory is not hypothetical but rests on a secure foundation of experimental facts. Though most convincing, Frank[68] and Marshall have not accepted this view as entirely accurate. In the marsupials the corpus luteum is well developed, yet in these animals implantation of the ovum can hardly be said to occur; only apposition, and not implantation of the ovum is seen in the ingulates in which the corpus luteum is highly developed; and finally it has been demonstrated that in women the corpus luteum might be removed in the early weeks of pregnancy without any disturbance to the ovum.

REFERENCES

(1) De Lee: Obstetrics. (2) Am. Jour. of Anat., 1905, iv. (3) Williams: Obstetrics, p. 67. (4) Bland-Sutton: Surgical Diseases of the Ovary, 1891. (5) Graves: Text Book of Gynecology. (6) Valentine: Handb. der Entwicklungsgeschichte des Menschen, Berlin, 1835. (7) Pflüger: Ueber die Eierstöcke der Säugethiere und des Menschen, Leipzig, 1867. (8) Waldeyer: Eierstock und Ei, 1870. (9) Nagel-Bardeleben: Handb. d. Anatomie, 1896. (10) Ztschr. f. Geburtsh. u. Gynäk., xxxiii, 326. (11) Arch. für Mikroscopie, 1907, lxxx, 547. (12) Minot: Modern Problems of Biology, 1913. (13) Jour. Exper. Zoology, 1904, p. 197, and 1905, p. 371. (14) Germ Plasm and Essays upon Heredity and Kindred Biological Problems (Comtemp. Science) Series B. 1893. (15) Arch. de Zoologie expérimentale et générale, vi, 165. (16) Arch. f. Protistenkunde 1911, xxi, 263. (17) Hertwig: Handb. der Entwicklungslehre, 1903, i, 86 and 476. (18) Arch. f. mikr. Anat., xxxi. (19) München med. Wchnschr., 1903, p. 1913. (20) Proc. Royal Soc. Edin. 1910, xxxi, 151. (21) Arch. de Biol., 1901, xii, 33. (22) Arch. f. mikr. Anat., 1865. (23) Köllicker, 1879. (24) Jour. de la Physiologie, 1858. (25) Contributions to the Science of Medicine, 1900, p. 593. (26) Handb. der systematischen Anatomie, ed. 2, p. 1873. (27) Arch. f. Gynäk., 1897, xxxiii, 334. (28) Traité d'anatomié descriptive, 1879, 720. (29) Arch. f. Entwick. der Organismen 1913, xxxv. (30) Jour. Anat., Sept. 15, 1920. (31) Jour. Obst. and Gynec., Brit. Empire, Jan., 1904. (32) Anat. Rec., April, 1916. (33) Marshall: The Physiology of Reproduction. (34) Thèse de Nancy, 1901. (35) Arch. de Zoologie exper. et gen. 1907. (36) Rev. med. de l'Est, 1902. (37) Arch. f. Gynäk., 1905, lxxv, 443. (38) Arch. f. Gynäk., 1911, p. 99, 491. (39) Arch. de physiologie normale et pathologique, 1889-1892. (40) Pflüger Arch., 1912, cxliv, 71. (41) Jour. Exper. Zoology, 1915, xviii,

1. (42) Shaffer: The endocrine organs, 1917, 141. (43) Archiv. de biol., 1910, xxv. (44) Archiv. f. Gynäk., Ed. 1904, li, 105. (45) Ztschr. f. Geburtsh. u. Gynäk., 1892, xxiv, 289. (46) Arch. f. Gynäk., 1895, xlviii, 276. (47) Vallet: Thése Paris, 1900. (48) Bull. Johns Hopkins Hosp., 1898, ix, 181. (49) Surg. Gynec. and Obst., Aug., 1920. (50) Arch. de biology, 1908, xxiv. (51) Proc. Royal Soc., 1905. (52) Arch. f. mikr. Anat., 1895, xlv. (53) Anat. Hefte, 1905, xxix. (54) Jour. Am. Med. Assn., 1906, and Jour. Morphology, 1911, xxii. (55) Traité philosophique de medicine pratique, Paris, 1839. (56) Ahlfeld: Lehrbuch der Geburtshülfe, 1898. (57) Trans. Obst. Soc., London, 1898, xlix. (58) Zijdschr. nederl Vereen, 1906, x. (59) Arch. Gynäk., 1906, lxxx. (60) Arch. Gynäk., xiii, 122. (61) Arch. f. Gynäk., 1910, xci, 530. (62) Arch. f. mikr. Anat., 1903, 62, 745. (63) Compt. rend. de l'assoc. d. anat., 1908. (64) Philosophic., Trans. Proceedings Royal Society, London, No. 96, 1904. (65) Am. Jour. Obst., Nov. 5, 1918, lxxvii. (66) Arch. f. Gynäk., 1903, lxviii, 438. (67) Arch. f. Gynäk., 1910, xci, 715. (68) Arch. Int. Med., 1910, vi, 314.

5310 Michigan Avenue.

Selected Abstracts

Gonorrhea in the Female

Norris and Mickelberg: Diagnosis of Gonorrhea in the Female by Staining Methods. Journal American Medical Association, 1921, lxxvi, 164.

In the acute stage of gonorrhea, both in the adult and child, the diagnosis is usually easily made from the history and clinical symptoms; if doubtful, it can be established by a smear. In chronic cases, the diagnosis is often difficult. Smears, to be of value, must be very carefully examined to guard against errors. Gonococci not only are few in number and often atypical, but may be confused with other bacteria of similar morphology. Gram's stain, if carefully made, will usually clear up the doubt. Owing to frequent sources of error, the authors believe that, unless done by an expert, stained films are of no value and, even when made by the most experienced, too much weight should not be placed on the findings. Diplococcus catarrhalis is almost identical with the gonococcus, both morphologically and tinctorially.

Material should be taken from the cervix, urethra, Skene's or Bartholin's glands, preferably by means of a medicine dropper the end of which has been drawn out to the thickness of a coarse capillary tube. In very young children the vagina is washed with dilute bichloride solution by means of a soft rubber eye syringe. The child's hips are raised and the solution forced out and sucked in a number of times; the washings are then centrifuged at slow speed and the sediment examined.

In concluding the authors state that, in their opinion the usefulness of staining methods has been overestimated; that clinical evidence is of greater value, even when the films are prepared by an expert; that, under most favorable circumstances, positive smears can be obtained only in a small proportion of cases; and, that, from a practical standpoint, all cases should be regarded as gonorrheal unless proved otherwise.

R. E. Wobus.

Jacoby: Gonorrhea in Women. Medical Record. 1921, xcix, 14.

Gonorrhea is responsible for more than 50% of all female pelvic inflammatory conditions. From a study of a series of cases—60% of infections were combined cervical and urethral, 30% cervical alone and 10% urethral alone. In a series of examinations of 300 cases, 100 were clinically diagnosed as gonorrhea. One smear examination of the 100 cases resulted in 8 positive and 12 doubtful microscopic reports. After taking an average of five smears from 50 of the cases of clinical gonorrhea 47 or 94% showed positive smears or about 32% positives among the entire 300 cases examined. Single smear report is not to be relied upon. Complications and end results of gonorrheal infections are discussed by the author and proper treatment is outlined. Extreme conservatism is advised in meeting complications. Whether the patient remains a source of infection depends largely upon the thoroughness with which the freedom from infection is determined, the author giving 5 conditions which should be carried out before discharging a case from observation and treatment.

C. O. Maland.

Rubin: Vaginal Discharge in Children. Diagnostic and Specific Value of Smear Examinations. Boston Medical and Surgical Journal, 1918, clxxviii, 147.

The writer studied this problem on 255 selected cases in the Special Clinic for Vaginitis, maintained in the Mt. Sinai Hospital Dispensary, New York. In this paper two points receive special attention: (1) the incidence and prevalence of gonorrheal vaginitis in children, and (2) the value of smear examinations in the diagnosis of this disease.

The general consensus of medical opinion undeniably favors the gonococcus origin in the vast majority of cases of vulvo-vaginitis in children. Upon this assumption are based all rules for prevention, control and cure of the disease as applying to homes, hospitals and communities. Observations in this class of cases have led Rubin to a conclusion contrary to the one prevailing. Too much value is placed on the outcome of the smear examination for diagnosis. Cases with a positive first smear are reported negative for one or more times consecutively, then again to turn positive. The same inconsistency can be observed in regard to first negative smears. Results of smear examinations are out of all logical relation to the clinical status of the case, the character, amount or duration of the discharge, and especially to subsequent examination. Frequently without any treatment a second report was negative, a third positive, then changing erratically. Even after all discharge had disappeared after treatment no reliability could be placed on the outcome of the smear. This obviously proves a great drawback in the study of a useful therapy. Rubin started with the strong silver solutions, recommended by Kelly. The immediate result invariably was an increased discharge, often with positive, occasionally with negative smear reports. Changing to weaker silver solutions at least the amount of discharge lessened or disappeared. Again smear reports remained erratic and unreliable. From these weaker solutions Rubin turned to applications in longer intervals until finally, for purpose of control, he simply observed those cases without any treatment which at least clinically did not seem

gonorrheal. Also in the untreated cases smear reports remained confusing. But surely in this group the children seemed to do better at least as far as the discharge was concerned.

This evident contradiction between smear and symptomatology may be explained, first, by the fact that the gonococcus, if responsible for vaginitis in a child, is biologically different from that in the adult form of the infection, and, secondly, that the diplococcus seen in the smear is not a true gonococcus though not distinguishable from it in appearance and staining characteristics.

In favor of the first contention it must be emphasized that from the clinical side the very smallest number of children resemble closely the disease as met with in the adult. In the vast majority of them the common sequelae are missing, such as ophthalmia, urethritis, joint involvement, and most of all peritoneal symptoms and complications.

In regard to the microscopic resemblance to the true gonococcus it is known that vaginitis in children often is caused by micrococcus catarrhalis (morphologically often indistinguishable in the smear from the gonococcus), by pneumococcus, meningococcus, streptococcus, and very often by the omnipresent bacterium coli.

That a true gonorrheal vaginitis does occur in children, however, cannot be denied. Its actual incidence probably is small. The definite diagnosis of such an infection cannot be based solely on smear examinations, but must be confirmed by bacteriologic cultural methods and serologic tests.

Asch: Gonorrheal Infection of Small Girls. Zeitschrift fuer Geburtshuelfe und Gynaekologie, 1919, lxxxii, 28.

Tubal occlusion, in the absence of a history of gonorrhea customarily regarded as congenital, might well represent the end effect of an infection acquired in early childhood. In some instances this infection of the genital tract might have been started by scarlatina or diphtheria, but most often it has been a gonorrheal infection. Also some of the vaginal adhesions and occlusions, formerly considered congenital, now are recognized as due to a gonorrheal infection of the young. Similarly might be explained the etiology of some obscure cases of cervical stenosis. Retraction and agglutination of the tubal fimbriæ terminating in complete occlusion of the tube, in general are characteristic for gonorrhea, and hardly ever seen after other infections, e.g. after appendicitis.

Saenger was among the first to suggest that in young girls an otherwise unintelligible peritonitis, or peritoneal irritation, or suspected appendicitis in fact may be an ascending blenorrhoic infection which later in life manifests itself in the form of sterility.

It will become an important problem of scientific investigation to inquire into the later life history of children suffering from gonorrheal vaginitis. A study by Block, made on a small number of treated and cured cases, only proves that some of them later in life become pregnant and bear children. But this still leaves unsolved the more important question of the ultimate fate of the vast number of untreated cases, and of the final outcome in instances of unexplained peritonitis during early childhood. Pediatricians however, will realize that in

children not too much weight can be placed on the symptom of abdominal pain, the most important symptom of a peritoneal irritation. In some of these cases the pain might be solely due to the complicating cystitis. The diagnosis of peritonitis due to ascending gonorrheal infection in the young child can be made definitely only by excluding the possibility of an appendicitis as cause for the peritoneal symptoms. It seems obvious that in the little child a gonorrheal infection only extremely rarely will succeed in passing the barrier of the external os and the cervical canal.

In the treatment it is well to remember that in the child the rectal mucosa often becomes infected. In speaking of the advantage of using the well instructed mother for treating the child, Asch emphasizes that eye complications are so rarely seen because the danger of the child's gonorrhea to her eyes is so well appreciated by the laity.

Recent attempts to combine local antiseptic treatment with general therapy (arthigon, vaccines, collargol, artificial fever, very hot continued baths, diathermy, etc.) as a whole have failed. Proper local treatment, chiefly with antiseptic vaginal suppositories, finally always results in cure. But even in cases of apparent clinical cure, with successive negative smears, the child must be kept under observation for a long time.

Asch in his conclusions states that ascension of the gonorrheal infection into the uterus is very rare before puberty. In the child local vaginal treatment does not favor ascension. Cured cases do not reveal permanent injuries later in life. Without treatment the infection apparently persists, and in chronic cases may lead to permanent damage such as complete tubal occlusion.

Wachs and Mazer: Gonorrheal Vaginitis in Children. New York Medical Journal, 1920, cxi, 1997.

During the earlier part of 1919 the writers gave a thorough trial to a silver paste prepared for Dr. John Cooke Hirst, which theoretically seemed an ideal treatment for gonorrheal vaginitis in that its slow solvency effected a constant contact with the vaginal mucosa for 24 hours. Though some patients improved temporarily, the final results did not warrant the further use of this preparation.

In April 1919, therefore, they began the use of Dakin's oil in a series of 58 chronic cases, some of them having resisted treatment up to four years. They employed a freshly prepared one per cent solution. The child lying in Trendelenburg position, the vagina is filled by means of a dropper, and then the labia held compressed for a few minutes. This treatment is given daily, alternatingly in the clinic and at home by the mother. Smears are taken every two weeks. Within a month improvement is marked. Twenty-five cases appeared to be cured at the end of the third month. At the end of the fourth month 39 children had been discharged, leaving 6 patients still showing pus-cells and many bacteria. The oil in this concentration is well borne in chronic cases, but proves too irritating in the acute stage. Recurrences were seen in from one to four months after apparent cure, therefore, it is necessary to keep all children under prolonged observation.

Northrup: Two Cases of Gonococcal Peritonitis in Young Girls. Archives of Pediatrics, 1918, xxxvi, 475.

The original histories of these two cases had been reported by the writer in 1903. Now, 16 years later, he places the fact on record that both girls had married and one of them borne a child. In regard to this case it proves interesting to recall the following features of the original report: The infection had been acquired from an adult in the family. Onset was exceedingly abrupt, abdominal pain at once very intense. Localized pain and sensitiveness in the right iliac fossa, moderate abdominal distension, ghastly pallor, temperature 104½ F. Six hours later a laparotomy was performed, revealing an intense injection of the entire peritoneum, the cecum being blood red. Appendix was removed; ovaries and tubes showing the same red color were not touched. Prompt recovery.

Bucura: Gonorrhea in Women. Wiener klinische Wochenschrift 1920, xxxiii, 789.

A long article covering the course and treatment of gonorrhea. The gonococcus grows best at the temperature of the human body. It is not resistant to heat as it dies in cultures kept at 36° to 37° C in 13 to 14 hours and at 40° C in 7 hours. It is resistant to lower temperatures as it can be regained from the heart blood 24 hours after death. This is significant in using hot douches and baths in treatment though perhaps the hyperemia is the effective agent.

The gonococcus manufactures a toxin which causes an inflammation resulting in a serous, hemorrhagic, purulent, or mucopurulent exudate. The germ penetrates undamaged epithelium between the cells, eventually reaching the subepithelial connective tissue, leading to endarteritis, thrombosis and metastasis. This fact explains the slight benefit from a direct application of drugs.

The gonococcus attacks most easily cylindrical epithelium, less easily pavement epithelium. The urethra, ducts of the vulval and urethral glands, cervical canal, uterine cavity, and tubes are specially prone to become infected; the vulva and vagina only at the periods when their epithelium is soft and succulent, i.e. before puberty, during pregnancy, and in old age.

Some individuals and families seem to have an immunity against infection and extension of the process.

The duration of the disease is not known. Persistence for ten years and more might be due to reinfections. It is known that the germ dies quickly in closed cavities such as a pyosalpinx. The author has seen the ascension of the infection to the tubes with simultaneous healing in the cervix and uterus which he thinks may be due to the development of an antitoxin.

The diagnosis is simple when the germ is seen. The chronic cases require a painstaking examination of the discharge from urethra, vulval glands, and crypts, vagina, cervix, and uterine cavity, repeated many times. The author insists upon the necessity of finding the gonococcus for the positive diagnosis because the disease has no typical clinical symptoms and may be confused with any gynecologic disease causing discharge.

The gonococcal etiology of adnexal disease is established only by discovering the germ. The wrong diagnosis is made too often. If prostitutes are left out of consideration, less than 50% of adnexal inflammations are due to the gonococcus.

The treatment consists of rest and abstention from coitus, the use of vaccines, and local applications. Vaccines are used in all cases because they seem to lessen extension of the trouble to the uterus and tubes. A polyvalent vaccine is used at intervals of 3 to 8 days beginning with 5 million, then 25, 50, and 100; then 100 repeated to a total in all of 10 to 12 doses.

There is no specific drug for local application. Silver nitrate, corrosive sublimate, and carbolic acid coagulate the exudate and prevent further penetration of the agent. Protargol, collargol, argentamin, and methylene blue in 1 per cent or stronger solution are the best. The urethritis rarely needs treatment, it gets well if let alone. The treatment of the urethral and vulval glands and crypts is most difficult and may require excision. The vagina is seldom infected. Tampons have no place in the treatment, but douches at least wash out the discharge. In treating the cervix the exudate is removed and the drug applied to a clean surface.

Infection of the uterine cavity frequently causes tubal infection. The latter will not heal until the uterine infection is cured. The uterine cavity is treated by the injection of a few drops of any of the above drugs through a ureteral catheter introduced with the strictest regard for asepsis.

Acute infection of the tubes is treated symptomatically. When the acute symptoms subside vaccines and local treatment are given. The latter consists of douches, tampons, hot air, and later on intrauterine treatment. Operation should not be done in the subacute stage because of the danger of peritonitis, of infection of the wound, and phlebitis. Operation in the chronic stage is determined by the symptoms and such social indications as marriage or sterility.

Definite cure is established as follows: During treatment discharge from the several sites of infection is examined once or twice a month; when clinical symptoms have become stationary or have disappeared for several weeks after the last finding of the gonococcus treatment is stopped; then the patient is seen once or twice a month for three months. She leads a normal life and is allowed coitus with a condom. Postmenstrually secretions from the various sites are examined, if no gonococci are found during these three months Bucura considers the patient as cured. FRANK A. PEMBERTON.

Stevens and Heppner: Gonorrhea of the Lower Genito-Urinary Tract in Women, with Special Reference to the Glands of Bartholin. Journal American Medical Association, 1920, lxxv, 1477.

This study is based on 3,439 examinations of prostitutes detained at the San Francisco County Hospital. Chronic gonorrheal infection was determined in 43.5 per cent. At first the diagnosis was based on clinical findings plus either the detection of the organisms in smears or a ++ or +++ positive complement-fixation test, the fallibility of both of these methods being conceded. Later, the diagnosis was based on clinical findings alone, yet in 95 per cent of cases so diagnosed, Gram-

negative organisms were demonstrated at some time during their stay in hospital. In 47 per cent the infection was in the cervix, in 32 per cent, in the urethra, and in 23 per cent in the glands of Bartholin.

Cervical smears were obtained by cleansing the canal and then compressing the cervix between the blades of a bivalve speculum. In the examination of the urethra, the two glass test as well as urethroscope and skenoscope were employed. The filiform bougie was used to locate and explore the urethral as well as Bartholin's glands. Strictures of the urethra, which, the authors state, are relatively common in women, were determined by bulbous bougies.

The following treatment is advocated: Cervical infections are treated by cauterizing with 25 per cent silver nitrate solution twice weekly for one or two weeks, supplemented at times by prolonged hot douches. Acute urethritis is treated by rest, diet, oil of sandalwood and alkaline diuretics; if it becomes chronic, instillations of 1 to 3 per cent silver nitrate, or local applications of stronger solutions through the endoscope, are advocated. Infected urethral glands are destroyed by actual cautery or fulguration. Strictures are dilated or incised. All palpable Bartholinian glands are removed. The injection of glands was found to be of little value.

The authors feel that gonorrhea occurs more frequently in women than is generally appreciated, and should be accorded more attention than heretofore. R. E. Wobus.

Froriep: Treatment of Infectious Diseases of the Vagina with Tincture of Iodin. Muenchener medizinische Wochenschrift, 1920, lxvii, 1202.

Iodin applied to the mucous membranes of the vagina has proved very efficacious in the treatment of the various types of vaginitis, especially when gonorrheal in origin. A single application is made the first time, which results on the second day, in a moderate swelling of the mucous membranes; this disappears about the third day. The dark necrotic membrane sloughs off. In a few cases considerable burning pain is experienced which rarely persists over two hours. If the purulent discharge persists after the first application, it is repeated one or more times. In urethritis it is employed merely to prevent extension of the infection into the bladder and so is useless where cystitis has already developed: its use here demands subsequent catheterization. S. B. Solhaug.

Foss: Treatment of Gonorrhea in Women. British Medical Journal, March 27, 1920. No. 3091, p. 434.

The comparative failure of most reagents in the treatment of gonorrhea in the female is due to the inaccessibility of the gonococcus in the various glands. It seems rational to suppose that a greatly increased secretion from these glands will produce a flushing out of the gonococci. This increased glandular secretion the writer claims to achieve with glycerin, which he mixes in the proportion of 1 to 4 with water, adding 1 gram of methylene blue to 100 c.c. of the solution. After cleansing of the vagina, gauze soaked in this solution, is packed against the cervix. He uses simultaneously gonococcal vaccines giving a total of six injections, weekly, commencing with 5 million bacteria, increasing up to 150 millions.

Block: The Treatment of Acute Gonorrhea in the Female. American Journal of the Medical Sciences, 1920, clix, 572.

The main object of this paper is to encourage more extensive instruction in medical schools in the treatment of acute gonorrhea in the female, so that the practitioner may be less skeptical and undertake the treatment of these cases with a cheerful optimism as to the outcome, even though he may not be successful in all cases. Methods of treatment that have proved most satisfactory in the writer's personal experience are given as follows:

Acute Urethritis.—Santal oil, 10 minims, three times daily; urinary sedative containing 5 minims of tincture of hyoscyamus and 10 grains of sodium bromide to one dram of liquor of potassium citrate, taken every three hours. Local treatment to begin only two to three weeks later. A 15 per cent solution of silver nucleinate or a 5 per cent solution of silver nitrate are applied along entire urethra with a cotton swab on an applicator.

Acute Endocervicitis.—Hot douches of a 1 to 8000 solution of potassium permanganate four to five times daily. Cervical canal is cleansed with liquor antisepticus alkalinus up to internal os, then vigorously painted with a 10 to 12.5 per cent solution of silver nitrate, immediately followed by tincture of iodin. Only in exceptional cases use is made of vaginal tampon. This treatment is repeated twice or three times a week, the patient in the meantime using douches.

Saenger: Acute Gonorrhea in the Female. Monatsschrift fuer Geburtshuelfe und Gynaekologie, 1920, liii, 197.

The one main endeavor in the treatment must be to prevent the infection from traveling up into the cervix. Therefore, local treatment is best limited to antiseptic applications to urethra and paraurethral ducts, and all vaginal douching is prohibited. The patient is kept as quiet as possible, and ordered to bed at least during the time of menstruation.

Ivens: A Note on the Use of Antigonococcal Serum. British Medical Journal, 1921, No. 3133, 77.

The author reports on the use of the serum in about 32 cases. In 22 of these tubal infection was a marked feature. Endocervicitis was present in 3. There were also 3 cases of arthritis. The method of administration was by subcutaneous injection in 19, intratubal and peritoneal injection in 6, use of vaginal pack in 3, and serum dressings in 2 cases of Bartholinitis. The method of subcutaneous administration was to give 20 c.c. of the serum diluted in normal saline. It was repeated at intervals of a couple of days to a week, giving in all from 20 to 200 c.c. In the surgical cases, conservative procedures were adopted. Twenty c.c. of the serum were injected into the tubes and a residue was left in the pouch of Douglas. In a few cases of endocervicitis he used packs with as much as 200 cubic centimeters of serum. He has not tried the intravenous administration of the serum. Only cases definitely gonorrheal in origin are included. They all made a good immediate recovery. There were three ultimate failures, one acute case where he had employed an insufficient amount of serum,

and two relapses after a period of some months which may have been due to re-infection. The subjective symptoms seem to be relieved by subcutaneous injection.

The author reports 6 cases in detail. He does not wish to be understood as drawing any definite conclusions from such a small series of cases. He used both indirect and direct methods of administration. The latter was favored because the toxin is not diffusible and the gonococcus similar to the meningococcus has an endotoxin. Results should, therefore, be more favorable by bringing the serum directly in contact with the organism. The serum was prepared by Professor Nicolle of the Pasteur Institute. F. L. ADAIR.

Kapferer: The Treatment of Gonorrhea with Hot Baths. Wiener klinische Wochenschrift, 1920, xxxiii, 107.

The author treated 10 cases of acute gonorrhea, some having salpingitis, by means of hot baths after the method devised by Weiss. This method is based on two assumptions: that the gonococcus dies at a temperature of 40° C and that the body temperature can be raised to and above that degree by means of a protracted hot bath. The bath is started at 38° C. and the temperature raised gradually in 15 minutes to 43° C., in some cases as high as 46° C. The patient is kept in the bath as long as possible, the longest in this series being one hour and fifty minutes. The highest body temperature, taken by mouth, was found 42.8° C.; but in most patients it was not higher than 41.5° C. The baths are given on successive days, the largest number given to one patient being 10, most patients getting only 5 to 8.

The treatment is very severe, many patients having a pulse rate up to 160, at which point the bath has to be stopped; many patients vomit; they are restless; the blood pressure rises 10 to 20 points; and even collapse occasionally occurs, one patient being comatose for several hours with a blood pressure of 50. The customary local treatments were carried on during the period that the baths were used.

Four cases did not complete the treatment. Three cases showed gonococci in the cervix at the completion of treatment. Three cases showed cessation of discharge and no gonococci at the end of treatment, one of them being examined only once.

The author concludes that (1) The body temperature can be raised by hot baths; (2) The treatment is very severe and can be employed only in robust patients; (3) A definite result cannot be expected.

FRANK A. PEMBERTON.

Romeick: Treatment of Gonorrhea in the Female with Intravenous Injections of Collargol. Zentralblatt für Gynaekologie, 1920, xliv, 611.

Prompted by the good results reported by Manzi with this therapy the writer studied its effect on 20 cases of uncomplicated gonorrhea of urethra, cervix and Bartholinic glands.

A two per cent solution of collargol was injected, in intervals of from 3 to 5 days. Beginning with a dosis of 2 c.c., he gradually increased it to a maximum of 11 c.c. About 3 to 4 hours after the injection a severe reaction occurs with chills, elevation of temperature, pain in head and back, and general malaise. These symptoms disap-

pear in the course of 4 to 5 hours. Two patients developed an albuminuria, in a third the headache became so intense that treatment had to be stopped.

Only 17 patients were finally considered cured, but they also had received local applications of silver solutions and of heat. Three patients remained uncured after receiving injections for from 7 to 11 weeks. The cured patients averaged 6 injections within 40 days. The writer concludes that this combination of the customary local treatment with intravenous injections of collargol seems to shorten the usual time required for cure, but that the method cannot be regarded as free of all danger.

Brauns: The Question of Treatment of Gonorrhea in the Female. Zentralblatt für Gynaekologie, 1920, xliv, 16.

With the enormous increase of gonorrhea among men, as one of the effects of the war, renewed and increased interest is shown in the question of the successful treatment of the infection in the female. Many new forms of therapy have been suggested, many of the older ones have been modified. With skepticism one has to look on the "results" recorded after mere experimentation with such methods as injection of turpentine, collargol or milk, with diathermy, vaccine therapy, or the effect of light rays (Gauss). How essential it is to scrutinize more critically new suggestions is well exemplified in the method advocated by Manzi, consisting in a combination of antiseptic local applications with intravenous injections of collargol. The results, recently recorded by Albrecht with the Manzi treatment, in the main only prove how persistent physicians, and how tolerant patients can be. When is a gonorrhea to be considered as cured? Surely not when "all clinical symptoms" have disappeared. Of practical value is only the positive gonococcus smear, never the negative one. It is a known fact that gonococci may remain for a long time in a latent state in folds of the mucosa or especially in the paraurethral ducts.

For years it has been the rule in Menge's clinic in Heidelberg in cases of urogenital blenorrhea to restrict all treatment to the urethral gonorrhea and to leave the uterine infection severely alone. This form of therapy, as a whole, probably proved as good or as bad as any other treatment used anywhere else.

Of late the author experimented in Menge's clinic with a new type of antiseptic suppositories, characterized by the fact that they are "foam producing." Various preparations of this sort are now on the market. By the addition of tartaric acid and bicarbonate of soda this suppository causes a fine foam to form. The particular antiseptic substance contained in the suppository presumably is distributed over and actually driven into the mucosa by the bursting of these small bubbles containing carbon dioxid. The process continues for some time and thus is supposed to act like an antiseptic douche kept up for a long period.

Brauns acknowledges that theoretically these "foam producing" suppositories would seem useful, but that so far experimentation with them does not warrant the assertion that they prove more useful than the accepted treatment of Menge's clinic, limited to urethral applications combined with vaginal antiseptic douches.

Prochownik: Gonorrheal Latency and Latent Gonorrhea. Monatsschrift für Geburtshuelfe und Gynaekologie, 1919, l, 302.

The fact is not properly appreciated that gonococci might be present and propagate in the mucosa for a comparatively long time before their presence is manifested by clinical symptoms. During this, occasionally long, period of latency the patient obviously proves infectious. This holds true also for the latency of infection continuing after all subjective and objective symptoms have disappeared, when finally the patient might recover spontaneously. However, more often this latter type of gonorrheal latency finally leads to a latent gonorrhea. Only much later its existence is revealed by new symptoms, usually the result of overwork or of renewed sexual activity but without a new infection.

It will be of great practical importance to advance our information concerning the problem of gonorrheal latency.

Wildenscov: Gonococcus Peritonitis. Ugeskrift for Laeger, 1920, lxxxii, 1227. Abstract Journal American Medical Association, 1920, lxxv, 1758.

He describes the eleventh case of gonorrheal peritonitis in women observed in a Danish hospital and emphasizes the arrest of menstruation as an early symptom. Tenderness in both iliac fossæ, early meteorism with a lack of stiffening of the abdominal walls are important in the diagnosis of the toxic form. The prognosis is favorable in this particular form, but even in the infectious type is better than in any other form of peritonitis. In the 36 operated cases thus far recorded the mortality was only 16.6 per cent. He advises an expectant treatment, to be followed by operation if conditions grow worse.

Salcedo: Gonococcus Peritonitis. Revista Medica de Chile, 1919, xlvii, 59. Abstract Journal American Medical Association, 1919, lxiii, 459.

The onset of gonococcus peritonitis does not differ from that of any diffuse peritonitis, though as a whole the general condition of the patient remains more favorable. There is less vomiting or tympanism, the tongue is moist, the septicemia seems mild. Nevertheless he advocates immediate operation. Laparotomy reveals as primary focus the tubes or ovaries or both. In one of his operated cases, ending fatally, there existed a mixed infection of gonococcus with streptococcus, the toxemia being intense.